



TANGANYIKA TERRITORY

DEPARTMENT OF AGRICULTURE

Annual Report

1937

PART II

1939
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The Report of the Director of Agriculture on the Territory as a whole is published as Part I of this report. Annual Reports of the Coffee, Sisal and other experimental station have been published separately as pamphlets. These reports are obtainable either from the Director of Agriculture, Morogoro, or from the Government Printer, Dar es Salaam.

DEPARTMENT OF AGRICULTURE

ANNUAL REPORT 1937

PART II

I.—ANNUAL REVIEW OF THE NORTH-WESTERN CIRCLE FOR THE YEAR 1937

(LAKE AND WESTERN PROVINCES)

1. *Staff*.—Certain changes in the disposition of staff among Lake province districts have been made. No longer is an agricultural officer stationed at the Nyakato Agricultural Training Centre or in the Biharamulo district. The former post is now filled by an agricultural assistant under the direction of the Agricultural Officer, Bukoba, while different parts of the Biharamulo district have been put under the Agricultural Assistant, Ngara, the Overseer, Agricultural Stations, Biharamulo, and the Agricultural Officer, Bukoba. An agricultural officer was posted to Musoma. For the latter half of the year no European staff has been available for the Kwimba district. The Ginnery Inspector, Morogoro, was seconded to the circle for a short while to assist the native authorities in the layout and construction of new permanent markets for the sale of cotton and other produce.

2. In the Western province, no changes of staff have been made, but during the greater part of the time the Agricultural Officer, Kigoma, has been absent on leave and no relief has been stationed in that area. A former forest officer was temporarily employed for a few months and prepared a preliminary scheme for afforestation and anti-erosion work in the Kasulu highlands; it has not been found possible however to implement this scheme in full during the year under review owing to lack of staff.

3. The African staff both departmental and those placed at our disposal by native authorities have for the most part given loyal and honest service. Employment in the department does not, however, appear to offer the African a sufficiently attractive career; few remain any length of time in the service as will be shown by the following data concerning our departmental instructors :—

Instructors with 15 or more years' service	...	4
„ 10 „ „	...	6
„ 5 „ „	...	14
„ less than 5 years' service	...	89

113

In 1932 there were 69 instructors employed, and of these only 24 remain in service to-day.

4. These hundred odd instructors are the immediate link between the agricultural officers and their work on the experimental stations and the 2,127,000 people who live in the Western and Lake provinces over an area of 136,000 square miles. A reliable and experienced native staff is thus essential.

5. Sir Frank Stockdale, Agricultural Adviser to the Secretary of State, visited the circle in February, shortly after the Parliamentary Commission under the chairmanship of Lord de la Warr had visited all the important centres.

6. Members of the Bantu Educational Kinema Experiment visited the circle and took films at Ukiriguru, Lubaga, Old Shinyanga (tsetse) and Geita (mining). The films and projecting units have now been distributed among the districts and by the end of the year agricultural films were being shown. It is however too early to gauge the value of this form of propaganda.

7. During the year visits to the circle have been made three times by the Director of Agriculture and once by the Deputy Director. The Entomologist visited the area twice during the year his tours covering principally Mwanza and Bukoba districts.

8. Mr D. Thornton, Agricultural Officer, attended the Uganda Cotton Conference in November.

9. Visitors from neighbouring territories have been Mr M. G. de Courcy-Ireland, Agricultural Officer, with a party of seventeen Teso Chiefs, Native Authority Police, and Instructors from Uganda; Mr L. Lynn Watt, Senior Agricultural Officer and Mr C. O. Oates, Agricultural Officer, from Kenya to inspect the Sukuma Produce Markets; and Mr D. L. Blunt, Director of Agriculture (Nyasaland).

CLIMATIC CONDITIONS AFFECTING CROP PRODUCTION

10. During the first quarter of the year the rains were good throughout the province with occasional dry periods. But when normally the rains should have fallen off there were ten days of exceptional and almost continuous heavy rainfall, at the end of which the country lay water-logged. Rain then stopped abruptly.

11. The effect of these heavy late rains was not immediately apparent, but it was ultimately seen to be serious. The early robusta coffee flowerings in Bukoba were reported not to have set well presaging a light robusta crop in 1938; thrips made an appearance in Bugufi coffee. In many parts, particularly Maswa and Kwimba, groundnuts grew in the soil before they could be harvested, also the surface soil set in a concrete-like crust and the harvesting of the crop became very difficult. With cotton, the early crop suffered considerable damage; the late crop had received no compensating benefit and owing to sudden cessation of the rains no top crop was set. Rice alone of the export and the food crops was not affected.

GENERAL

12. A common major problem of this circle is one which is closely linked to the problems of tsetse, erosion, and nutrition as with production for export. It is that of persuading natives to adopt suitable farming methods so that they may become anchored to holdings of adequate size, the fertility and productivity of which may be maintained or increased and their output per working hour made more economic; in short a permanent homestead run on mixed farming lines.

13. It is not an easy problem to solve, custom and taboo are possibly the biggest bugbears to be countered ; therefore a study of customs and an intimate knowledge of the African are to be commended. The existence of sleeping sickness, animal trypanosomiasis and east coast fever in certain parts add complications to the finding of a solution ; accordingly the co-operation of the Medical Department (Sleeping Sickness Branch), Tsetse Research Department, and Veterinary Department is essential. The Forest Department are of course involved and the Geological Department can be of assistance in apparently waterless areas. The Administration are vitally concerned.

14. Four years ago demonstrations of ideal native holdings were laid down at several centres ; they soon became a practical proposition and became known as individual or peasant holdings. The essentials of a peasant holding are to provide the native cultivator with a sufficient acreage to practise a system of manuring and of rotation ; he must be assured security of tenure over his cultivated fields and his fallow and grazing lands, and fragmentation of holdings should be restricted as far as possible.

15. Practically every agricultural officer and many officers of the Provincial Administration have contributed to evolving a practical scheme of peasant holdings. Notable additions to the study and knowledge of the subject come from Mr C. Harvey, Agricultural Officer, Bukoba, with an account of the methods employed by the Bahaya in cultivating the sterile grasslands of that district and in building up a new holding capable eventually of growing all their normal crops ; and from Mr D. Thornton, Agricultural Officer, Ukiriguru, with a survey of a *gunguli* (four square miles in extent) in the apparently overcrowded area of the Nyanza Federation, Mwanza. Valuable proposals have come from Mr R. D. Linton, Agricultural Officer, Tabora, and Mr H. C. Baxter, District Officer, Tabora, with suggestions for peasant holdings in sleeping sickness concentrations and for advances of cash or kind to would-be-peasants by native authorities ; both these suggestions are still under discussion. In the Shinyanga district the adoption of many of the peasant holding practices by five natives on their own holdings is a tribute to the soundness of the theory and to the work of the last two agricultural officers in that district Messrs J. G. M. King and H. Gillman. Mr D. W. Malcolm, Assistant District Officer, has given valuable constructive criticism and useful advice.

16. Two experimental stations with sub-stations, and many native authority seed farms, demonstration plots and school gardens all serve to increase our knowledge of, and demonstrate the latest developments towards, a mixed farming basis for agriculture. Education is undoubtedly one of the most valuable factors assisting in the attainment of the objective.

EXPERIMENTAL STATIONS, SEED AND DEMONSTRATION FARMS

17. Reports of experimental work are published as departmental pamphlets ; hence the work is reviewed only briefly here.

18. *Nyakato Agricultural Training Centre (Bukoba)*.—The Agricultural Assistant reviews the work as follows : "The first full crop of coffee was picked this year and the tree yields provide a striking demonstration of the value of compost, grass mulching, and of careful planting. Other crops, maize, cassava, beans, etc., also prove the value of compost. The cattle feeding trials begun in August 1936 have demonstrated the importance of feeding the in-calf cow. Rotational grazing is having a beneficial effect upon the grasses in the several paddocks."

19. *Tarime Sub-station (North Mara, Musoma).*—The coffee has been uprooted and this centre is now used primarily as a cattle training and ploughing school, and as a multiplication centre for maize and beans in connection with the endeavour to stimulate local production of these crops for sale to the mines.

20. *Ukiriguru Experimental Station (Mwanza).*—The Agricultural Officer writes: "The work of selecting and proving both introduced and local varieties of food and cash crops has led to the isolation of a number of good strains and over fifty tons of improved seed of a wide range of crops was produced and a large proportion distributed. The greatest demand was for sorghum and maize. The extension work in bringing results to the notice of cultivators was carried out through the African staff, by the holding of *barazas* and the establishment of demonstration plots. In addition a number of parties of natives, usually accompanied by their chiefs were shown round the farm and the visitors with few exceptions showed a keen and intelligent interest."

21. Over a number of years, experimental work has proved: (1) the marked response in increased crop brought about by small dressings of farmyard, kraal or green manure, (2) the value of early planting, particularly of cotton, and (3) that close spacing and delayed weeding of groundnuts significantly reduces the incidence of rosette disease. These three results are all within the reach of the average native cultivator, by their adoption alone he can greatly increase his food and revenue crops without increasing the acreage under cultivation.

22. *Mwabagole Experimental Rice Plot (Mwanza).*—The total amount of paddy produced was thirty tons, of which twenty was from selected plants of the proved varieties Majimaji, Sena Mtebe, and Afaa, for distribution. The demand for Afaa was greater than could be met. Mwabagole has proved a most valuable centre not only for the Mwanza district but for all the rice areas in the circle.

23. *Nyamahona Peasant Holding Settlement Centre (Uzinza, Mwanza).*—The soils and climate have proved quite distinct from those of the Sukuma section of the Mwanza district; with further work this station should be especially valuable to the rapidly developing Uzinza area. The farm still needs more drainage but much work on this has been done in the past season. Grain crops were good, but poor harvests of both groundnuts and cotton were obtained.

24. *Mwasita and Shanwa Sub-stations (Maswa).*—The former seed farm at Mwasita has been definitely abandoned as it is too far from the station for supervision. It has served its purpose well in the past as a multiplication centre for Feterita Sorghum. The Shanwa farm is maintained as a demonstration centre largely for the instruction of the African staff.

25. *Lubaga Experimental Station (Shinyanga).*—Quick maturing varieties of staple crops, such as Feterita Sorghum, Awned Bulrush Millet, Virginia Bunch Groundnuts, and Katumbili Maize were grown for seed distribution, besides a large acreage of cotton. The Agricultural Officer writes that the farm provides a large amount of demonstration material of improved agriculture. An arrangement was made by which every Monday was set aside for a "Farmers' Day" during the main growing season. On these days parties of natives were conducted round the farm and the various activities explained to them.

26. *Ntungamo Seed Farm (Biharamulo).*—Owing to the lack of interest shown in this farm it was decided to abandon further work here; accordingly the coffee was uprooted, and the cassava selections and tobacco seed propagation

moved to a more suitable site near to the tobacco grading sheds and the Overseer's house, here the production of tobacco seed will be continued and sufficient land reserved for restarting a farm whenever desirable.

27. *Mwanhala Peasant Holding Centre and Farm (Nzega)*.—Buildings necessary to the farm were completed during the year besides which two miles of broad-base contour banks and one-third of a mile of stone-stepped drain were made; the cost of the banks using farm oxen and ploughs and hand labour being Shs 47/- per mile. Five hundred yards of windbreak were planted, and twenty acres of land broken to the plough and cropped. This farm is now therefore in a position to begin its real work of demonstration.

28. *Tumbi Peasant Holding Centre (Tabora)*.—Forty-four acres have been contoured, necessitating the making of three miles of broad-base contour banks at a cost of Shs 53/- per mile, and one-quarter of a mile of storm drain completed during the year. Twenty-five acres were cropped and a further seventy-five acres are reserved for future development if required. The demonstration at Marumba has been continued on the lines indicated last year.

29. *Makeri Sub-station (Kasulu, Kigoma)*.—Though handicapped by the absence of the Agricultural Officer for the greater part of the year, this farm has continued to exercise, under the supervision of an African Instructor, a beneficial influence in the Makeri concentration, and has provided a plentiful supply of seed including maize, sesame and Virginia Bunch groundnuts for distribution. Ridge cultivation which is an innovation in the district is practised here.

AGRICULTURAL EDUCATION

30. *Nyakato (Bukoba) Agricultural Training Centre*.—Forty-seven applications for admission were received of whom only twenty-nine were accepted; the average number of pupils during 1937 was forty-three of whom twenty-three were paying fees. There were eight in the third year course (Standard VII), ten in the second year (Standard VI), and thirty in Standard V at the commencement of the term. The Government Inspector of Schools visited the centre and made suggestions which have been adopted. The only change in the curriculum has been the addition in the third year of a course of simple mensuration applicable to native agricultural requirements. At this centre the boys are given a good general education and in addition are given both theoretical and practical training in agriculture with special reference to the conservation of soil fertility, the improvement of the coffee industry, and the advantages of more diversified farming.

31. *Ukiriguru*.—The Thursday afternoon lectures for farm employees and neighbours of the farm were continued.

32. *Lubaga Adult School*.—The Agricultural Officer, Shinyanga, writes: "The object of this school is to enable any peasant and his family to live on the farm for a year and through the experience gained by working on the farm and attending lectures, return to his home with a better understanding of improved methods of agriculture. Each family is provided with a house and a small patch of land to be worked by themselves. Both man and wife can work on the farm for the usual rates of pay. The type of work is frequently changed and includes assisting in the care of stock, ploughing, planting, cultivating, assisting in the making and maintenance of anti-erosion measures, and assisting the carpenter, mason and blacksmith. On certain evenings classes are given in which reading, writing and arithmetic may be learnt, and also

a course in elementary agriculture. During the year there were seven families attending this school, although owing to illness and other troubles this number dwindled to four towards the end of the year. Although permanent residents are slow in appearing—only four applications have been received for the 1938 season—several of the progressive natives who live within easy reach of Lubaga have started to attend the classes in elementary agriculture."

SCHOOL AND PRISON GARDENS AND FARMS

33. Educational officers have co-operated in making more use of school gardens. The Agricultural Officer, Bukoba, reports: "Regular visits have been made to school gardens, most of which include small plots of coffee maintained in excellent and productive condition by means of a grass mulch and regular pruning." The Kakora school at Ngudu and the Shanwa school have both managed their plots well and demonstrated useful lessons as to the value of manure. The native authority schools at Ibadakuli and Tinde in the Shinyanga district have received assistance from the Agricultural Officer, the general layout and working plan being devised to illustrate the value of manure to the land and of fresh vegetables to man. The Agricultural Officer, Tabora, reports assistance in the matter of seed, and advice to the Nzega and Kahama native authority schools, both of which have gardens consisting of plant museums and small fields farmed on a five course rotation.

34. The demonstration eight acres under our control at the Kazima prison farm has been continued and again proved highly successful, one-quarter is green manured each year (there being no stock available for manuring), and all cultivations are tie ridged, by these methods and rotation of crops the fertility of the farm appears to be increasing. A rough trial carried out at the suggestion of the Soil Chemist, Amani, indicates that there may be value in dressing land of the prison farm type with calcareous termite mound earth.

TRAINING OF AFRICAN INSTRUCTOR STAFF

35. Refresher courses for members of the departmental and native authority African instructor staffs of various districts were held at Nyakato, Ukiriguru, Lubaga, Mwanhala and Tumbi. The scope of such courses covered lectures on soils, the causes leading to loss of fertility, and methods of restoring and maintaining fertility. One instructor from the Maswa district attended the annual course in beeswax production held by the Entomologist at Morogoro.

36. The work of selecting and training the extra staff required for the native authority markets was carried out by agricultural officers. These Africans were trained in the use of steelyards, price reckoners and in inspecting and grading produce before undertaking their duties.

37. The erection of the proposed Sukumaland native authority instructor school at Ukiriguru had to be postponed owing to the shortage of staff at Ukiriguru throughout the year.

PLOUGHING AND INTRODUCTION OF NEW IMPLEMENTS

38. Different types of ploughs, hoes, cultivators and other implements, which cannot be purchased locally, are displayed at the Lubaga Experimental Station clearly marked with their price. The native buyers are registered so that should they later require spares, the make and type of their implements can be quickly ascertained. The money received from sales is remitted by the

Agricultural Officer to the firm supplying the implement who immediately replace the stock.

39. The popularity of the Perks No. 10 hoe referred to under this head last season has spread to Tabora, where eleven dozen were disposed of by the native treasury. Two "Appo" groundnut shellers and six "Planet Junior" cultivators were purchased on behalf of natives by the Agricultural Officer, Tabora; several new ploughs have been sold by the local shops.

40. Twenty-four cattle were trained for natives at Lubaga during the year, work being interrupted in the middle of the season owing to rinderpest quarantine. Sixty-four oxen were broken or retrained for native cultivators at Ukiriguru.

41. In connection with the encouragement of maize growing in North Mara it is intended to focus attention on the value of the plough as a means of cultivating on a large scale, of course following methods to prevent soil erosion. On the occasion of a visit to this area in the company of the Deputy Director of Agriculture it was observed that among the Jalu, many of whom are immigrants from Kenya, ploughing was already popular, and at Utegi shopkeepers were stocking ploughs for sale to natives. These ploughs were however of a cheap make, incapable of hard wear. A better and more lasting plough is being recommended. Schools for the training of plough boys and oxen have been started at Tarime and Utegi, and it is hoped next year to be able to report a considerable measure of progress, not only among the agricultural Jalu but also among the more pastoral minded Kuria.

AGRICULTURAL SHOWS

42. No agricultural shows were held during the year.

ANTI-EROSION AND AFFORESTATION

43. Most districts are about to undertake anti-erosion measures on a more elaborate and extensive scale. Hitherto ridge cultivation, on or near contour, has been the chief anti-erosion undertaking by individual cultivators, communal effort having been directed to the planting of windbreaks. With new and more extensive systems on a large scale, a great deal remains to be done. The following indicates the position in the districts:—

(i) *Biharamulo*.—Mostly a bush clad district. No work attempted except in the Ngara division where rules have been extended from coffee plots to all other cultivations; here much progress has been made.

(ii) *Bukoba*.—Erosion hardly noticeable; an experimental demonstration started embracing 150 acres.

(iii) *Musoma*.—Nothing achieved owing to lack of staff.

(iv) *Mwanza*.—Many rocky kopjes have been closed to cutting, burning and grazing, and in some areas regeneration of bush assisted by the sowing at stake of *Acacia arabica*. A move in the right direction but a great deal to be done yet, including, before any real progress can be made, the transference of some of the population from the more thickly to the more thinly inhabited areas.

(v) *Kwimba*.—As in Mwanza attention concentrated on regenerating bush growth on hilltops. Little done owing to lack of staff.

(vi) *Maswa*.—The Mwasita demonstration of 1936 was carefully watched and very slightly extended and altered, this demonstration has proved its value. The District Foreman writes: "Large areas between the banks which had been

absolutely bare of cover, are this year under fairly thick grass, and various erosion beginnings checked"; the stage is now set for large scale extensions.

(vii) *Shinyanga*.—This is one of the districts in which it may be said that real progress has been made. The work here is now neither demonstrational nor experimental; it is being extended to the whole district. African staff are being trained to carry out the survey work necessary prior to the building of contours. Various methods of construction have been applied on a large scale, and valuable information is now at hand as to the relative costs of these, thus—

				Shs	Cts	
(1)	Contour ridging by paid labour ...	...	...	17	60	a mile
(2)	"	"	voluntary communal labour ...	6	00	"
(3)	"	"	use of chief's oxen and a small amount of paid labour ...	6	70	"
(4)	"	"	tractor and a small amount of paid labour (1) ...	18	60	"
(5)	"	"	tractor and a small amount of paid labour (2) ...	53	00	"
(6)	"	"	oxen and locally made implements and paid labour ...	9	00	"

The third method seems a particularly valuable one for these thickly inhabited areas where cattle are easily available, but the working period for such cattle is very limited hence the work under such conditions cannot go ahead very quickly. Tractor costs varied considerably with the type of country being covered, while costs per acre have little resemblance to costs per mile of contour bank, since in some cases the banks can be few and comparatively far apart while in others they must be close together. Capital and European staff charges are not included in the above given costs. In all 629 acres were protected in the Shinyanga district, this being spread over ten different localities, the largest individual block covering 170 acres of recently cleared land, which will have been protected therefore from the start of its use for agricultural purposes; this area was that done by (5) above and the high operational costs were due to frequent stoppages owing to the land having been imperfectly cleared of stumps.

(viii) *Nzega*.—The Kahama section of the Nzega district is bush covered and on the whole well protected from erosion. The Nzega area, however, is windswept and has suffered severely from sheet erosion. Gully erosion has commenced and is being checked by contour windbreaks and closed to grazing for a period of years. Ten miles of *Cassia siamea* windbreak thirty feet wide have been planted. The area embraces 300 acres.

(ix) *Tabora*.—The area dealt with here is 200 acres in extent. Contour lines and storm trenches were surveyed and by the application of native authority rules, cultivators within the area are ordered to construct and maintain these, while between the main contour banks cultivations must be carried out on ridges running parallel to the contours.

(x) *Kigoma*.—There is urgent need for erosion measures in the Kasulu highlands. A district foreman employed especially for the purpose prepared a scheme of afforestation and direct anti-erosion work towards which £2,000 over the next five years has been promised by the native treasury. A conference of Administrative, Veterinary, Forest and Agricultural officers at Kasulu late in the year endorsed and enlarged on the scheme prepared by the district foreman and their conclusions are under consideration.

44. In conclusion it may be said that there is still a tremendous amount of work to do, especially as more elaborate large scale systems come to be the objective. The circle extends to 136,000 square miles of which approximately half is (luckily) tsetse infested and unoccupied, the remaining 68,000 square miles practically all needs to be protected from erosion by some alteration of present methods. The spread of contour ridge cultivation as opposed to flat cultivation and ridges running in the wrong direction; the adoption of rotational grazing; the planting of windbreaks and building of dams, the planting or regeneration of tree growth on hilltops, and on slopes too steep for cultivation; and the redistribution of the people are all palliative factors but it is becoming increasingly obvious that the most important measure is contour banking and the regulation of storm water by constructed banks and outlets. Progress is however being made and when funds for more extensive work are available, the experience now being gained will be of the greatest value.

CROPS IN DETAIL

45. *Grain Crops.*—Every district reports adequate food supplies of the principal grain crops, pennisetum, sorghum, maize, and eleusine according to districts. In most cases however yields per acre of these staple food crops are distressingly low. The Agricultural Officer, Ukiriguru, finds that 112 family units in the Nyanza Federation are cultivating an average of 5.66 acres each to grain crops and that the yields per acre average only 263lb. each family unit consisted on an average of 3.52 adults and 2.05 children, or a total of 5.57 persons; each person therefore is cultivating or having cultivated on his or her behalf one acre of grain crop.

46. Manured demonstration plots gave an average yield of 623lb. per acre; so that by adoption of manuring it seems probable that a fifty per cent reduction of the area under grain could be expected and yet a greater supply of grain food obtained. It is satisfactory to learn that the chief and every headman in the Bukumbi chiefdom will adopt manuring in 1938, while the Agricultural Officer, Tabora, writes: "It would be idle to state that full use is made of all the available kraal manure but it certainly is true to say that its use has greatly increased of recent years."

47. Special attention has been given late in the year to increasing production during the coming season of food crops in those areas adjacent to the mines in Musoma and western Mwanza, since the large labour force employed on these mines offers an outlet for a very considerable production of grains and pulses. These mines together with the Kagera tin mines at present purchase locally but a small proportion of their requirements, the balance being supplied by importation from Kenya. The propaganda for this increased grain production will go hand in hand with propaganda and demonstration of the advantages of manuring.

48. Rice is grown mainly as a crop for sale, though the main purchasers are the populations of the larger towns. The Kigoma crop, mostly of the variety Meli was up to average in 1937, but with heavy flooding of the Ruanda late in the year the likelihood of a good rice crop there in 1938 is jeopardized. The Luitchi river seems to be about to change its course through the Ruanda; should this occur, it may upset production there for some years. In Tabora and Kahama the cultivation of the variety Sena is increasing, while in Mwakarundi (Nzega) and also in Busubi (Biharamulo) the crops of Faya rice have justified the erection of mills. The Mwanza rice areas are adopting

improved cultural practices, earlier planting, closer spacing and the use of pure seed, such weed types as Karunde have been rogued out. The Mwabagole rice station has played an important part in achieving improvement throughout the circle, serving as a centre of seed supply, as a demonstration plot and as a training ground for instructors.

49. *Root Crops*.—A drive for increased plantings and better care of the root crops, cassava and sweet potatoes has been considered advisable in the Tabora, Shinyanga, Maswa and Musoma districts; elsewhere throughout the circle the care of and extent of these famine standbys appear satisfactory. The bogey of famine is a real one, but the fear of being found unprepared for famine must not be allowed to enforce the misuse of land. Cassava is an exhaustive crop; well farmed it will provide large crops of starchy food. Temporary shortages of food occur from time to time; these cannot be regarded as periods of famine but more serious shortages may occur in a second season if crop plantings are rendered late by cultivators searching for seed as well as food at the critical planting times. It is essential he should have at hand an adequate supply of planting material as well as a supply of root crops at his door. As part of the defence programme in England the fertilizing of the soil of that country is being considered; equally in this north-western circle is it essential if we are to safeguard ourselves adequately against food shortage or famine that we build up a reserve of fertility in the soil. This can be done slowly by grass fallows, but more rapidly by green manuring, composting or manuring.

50. In Tabora two local varieties of cassava, namely Pesai and Kabumba, appear to have considerable resistance to mosaic disease and special attention is being given to the cultivation and distribution of slips of these varieties; some 500 headloads being distributed through the native authorities during 1937.

51. *Pulse Crops*.—Beans from the western part of the circle are purchased and transported incredible distances by rail and road to the Lupa, while mines nearby import their requirements from Kenya. Beans of every shape and colour are grown throughout the western areas of this circle. Selections of the many varieties have been made to try out their yielding qualities, resistance to weevil, and palatability.

52. Pulses are not commonly grown in the eastern part of the circle. Pigeon pea seems the most suitable, together with Bonavist bean (Fiwi) and Tepary; these have been introduced and proved satisfactory under particular conditions, but are slow to be taken up by the people. Local varieties of gram and cowpea are small yielders. In this area however groundnuts are extensively grown both for sale and home consumption; this year the harvest was delayed owing to the hardness of the ground and, the price having been disappointing, the proportion for home consumption is considerable.

53. *Oil Crops*.—Groundnuts and sesame have always been grown throughout the circle in small quantities, production of the former however has within recent years expanded tremendously, while that of the latter has greatly decreased. All districts in the Western province (except Fipa) have broken their last season's records for export tonnages of groundnuts and Shinyanga has maintained last year's export. Maswa district and Kwimba district are the principal groundnut areas of the Lake province, both show considerable decrease in the quantities exported, while Mwanza which is not normally a large producer of this commodity shows a slight increase.

54. The cultivation of sesame is now mainly confined to the Musoma district, production there shows a decrease on 1936 figures, but a small increase is shown in Mwanza.

55. Trials continue to be made with Tung oil, but it is doubtful if this will be a successful introduction. Trials are also being continued with Soya bean varieties.

56. The cultivation of the oil palm was the subject of an article by the Agricultural Officer, Kigoma, published in the *East African Agricultural Journal*. Oil palms are mainly cultivated near Kigoma and also grow along the Lake Victoria shores in the Mwanza, Bukoba and Biharamulo districts.

57. *Coffee*.—Of estate agriculture in the Bukoba district the Agricultural Officer writes: "With the exception of one estate, which is small and intensively worked, there is no progress to record. Extensive coffee planting on the light Bukoba soils is unproductive and estates are maintained only with difficulty." Native production presents a very different picture: "The gross export value is, at £3 per family (2½cwt. of coffee) well above subsistence level; having reached this level the majority incline to rest on their laurels; it is a question of values, their leisure and their beer is purchased at the cost of small effort, and they are not at present inclined to ask for more." These two quotations give a fair picture of the Bukoba coffee situation: the European planter is severely handicapped by an exceedingly poor soil and it does not pay him to manure intensively the area necessary to give him an adequate turnover; the native producer on the other hand, on better patches of soil, thanks to generations of accumulation of crop and household refuse, can too easily cover all his requirements and is loath to burden himself with the small amount of extra labour which would be required to double or even treble his output.

58. For a time field work had to be discontinued owing to disturbances fomented by political-minded malcontents; the trouble however was soon over, and was followed by a readjustment of the policy of inspection under the Plant Pests and Disease Ordinance (Coffee Regulations), the chiefs agreeing to take a more lively interest than heretofore in this matter, thereby freeing the agricultural staff to give more attention to educational measures by propaganda and demonstrations of improved cultural methods.

59. Of the demonstration plots maintained, the Agricultural Officer states that the Nyakato plot "is quite the best coffee in the district, on the poorest soil", and of others, "the demonstration of improved practices in established coffee continues, principally of rough pruning (regeneration) and of mulching with grass or banana refuse. This is a slow process but appears to be suited to the crop and the people. A record is kept of the more progressive growers in each locality and it is the first duty of departmental instructors to assist them to improve their plots. From these plots as centres the instructors endeavour to extend improvements through the village." Progress is being made; the demonstration of improved practices continues and it is satisfactory to note that "where pruning was first demonstrated some five years ago, this has now been adopted as fairly general practice. Mulching, also, is becoming more general." The native authorities sold 400 pruning saws and 100 seccateurs.

60. Further experiments have been made with hullers, but nothing has been discovered which has proved as satisfactory for the grower and small trader as the locally made wooden huller.

61. The 1937 crop was a good one and would have exceeded the estimate of 9,500 tons had not prices slumped heavily at the end of the season. Prospects for the new 1938 robusta crop are not rosy but a good arabica crop is expected in the coming year.

62. The only other coffee centre of importance is Bugufi in the Ngara division of the Biharamulo district, where coffee forms the sole export crop, which this season amounted to 70 tons parchment and 6 tons cleaned *buni* as compared with 40 and 4 tons in 1936 and 14 and 2 tons in 1935. The prices received were also considerably in excess of those of previous years, it is not therefore surprising that the Agricultural Assistant writes: "The native here is more prosperous now than at any previous time, the receipts from this year's coffee crop have contributed to the prosperity . . . the outward and visible sign is in clothing: bark-cloth and goat skins have been almost replaced, generally by trade clothing." It is reported that: "The progressive cultural measures comprising anti-soil-erosion measures, mulching, pruning, etc., have been maintained and plantings increased." Prospects for 1938 are not, however, very encouraging, due to a severe and hot dry season which lasted from the end of May into September.

63. *Tobacco*.—Biharamulo produced 23 tons of fire-cured tobacco leaf which was sold at satisfactory prices, after regrading and baling had been carried out by the native authorities under the guidance of the department. Hail did some considerable damage in the early part of the year, but except for this the crop in the field did well; much more care is however needed in the curing barns where in the present season a considerable portion of the crop was spoilt.

64. *Cotton*.—The native is notoriously wasteful of cotton seed, yet it may be presumed that as from one year to the next the ratio of seed distributed to seed cotton sold by him reflects reasonably well the return which he has received for his labours. A comparison of the 1938 and 1937 figures, district by district, may therefore be of interest as it will illustrate how poor a return, due to unfavourable climatic conditions, was received in the present year as compared with last year (in tons):—

DISTRICT	1935/36 seed distri- bution	1936 seed cotton	Ratio cotton seed to seed cotton	1936/37 seed distri- bution	1937 seed cotton	Ratio cotton seed to seed cotton
Bukoba	—	—	—	6	54	9·0
Musoma	490	1,602	3·3	280	845	3·0
Mwanza	1,205	11,162	9·2	1,895	8,564	4·5
Kwimba	802	3,891	4·8	700	2,158	3·0
Maswa	818	5,330	6·5	1,000	3,520	3·5
Salawe	30	95	3·2	45	27	·6
Shinyanga	326	2,711	8·3	463	2,609	5·6
	3,671	24,791	6·7	4,389	17,777	4·0

65. *Bukoba zoned area*.—The first cotton crop grown in Bukoba for some years produced a most satisfactory crop, 88 per cent of which was "A" quality. The crop was purchased by the Masaka Ginning Pool (Uganda) at prices which

averaged 13·3 cents per pound for No. 1 cotton and 2·3 cents per pound for No. 3; the marketing season coinciding with the high prices which ruled early in 1937. A sum of £670 was distributed among some 2,500 growers; for a first year the return of seed cotton for seed distributed is most satisfactory and shows that this area is a promising one for cotton production. The area has a different cotton season from the remainder of the Lake province and for the 1937-38 crop which is now maturing 12 tons of seed were distributed to some 4,000 growers.

66. *Musoma zoned area*.—There was but a very poor demand in the Musoma district for cotton seed, and the crop harvested shows a very considerable decline from the figure reached in 1936. It is becoming obvious that the true cotton belt in Musoma is the immediate lake shore area only, the higher land around Ikizu being too cold for cotton, except perhaps in the driest years. North of the Mara river is now excluded from cotton growing by legislation as a barrier against pink bollworm from the north. Musoma growers are also exceedingly bad at harvesting cotton, intermixing with the seed cotton an undue proportion of leaf and dirt; this is largely due to their methods of harvesting but also to some extent to the damper climate making frequent picking more essential than in the drier Sukumaland areas. Now that an agricultural officer is stationed in Musoma he will have to give attention to this important matter.

67. *Sukumaland-Uganda upland area*.—In this area the cotton crop was most disappointing, due to excessive rain late in the growing season. Slightly more seed was distributed than in 1935-36 and the demand and planting was good, the yield however was but 65 per cent of the record crop harvested in 1936. The quality was good, first quality being between 80 and 84 per cent of the total; the value of this crop to the growers was £123,941.

68. *Shinyanga zoned area*.—The U/4/4/2 cotton in this district suffered similarly to the Uganda upland of the main Sukumaland cotton area from the very heavy May rains. Despite this, owing to the increased area planted, production during the year was only 100 tons short of the 1936 record. The cotton however was of poorer quality than formerly only 74 per cent being marketed as first quality. The value of this crop to the growers was £24,533.

69. *Sisal*.—There are occasional small sisal estates, mostly in a neglected or derelict condition, in Mwanza, Kwimba, Kigoma, Nzega and Tabora districts. Only six or so estates have been worked, even in the recent sisal boom. One thousand tons of fibre were exported from the Tabora district where cutting takes place on two estates, and 100 tons from Mwanza.

70. *Beeswax*.—The Agricultural Officer, Tabora, writes of the Tabora-Kahama area: "The year was favourable for beeswax production but collection was not as intensive as it might have been. Exports reached about 200 tons which is above average and the highest since 1935." Production in other areas is negligible.

71. *Gum*.—Shinyanga is the principal gum district in the circle, small amounts being collected also in Nzega, Maswa, and Kwimba. The Agricultural Officer, Shinyanga, writes: "This was a fairly good year for gum, the total exported amounting to 430 tons, this still falls below the average for the last six years which is 688 tons. Gum grading at the various markets was carried out on a different basis to that of last year, two grades being recognized. There should have been first and second grade gum, but only about two tons of the former was brought for sale."

VERMIN, PESTS AND DISEASES

72. Three men are employed in the Mwanza district on vermin destruction. good results against baboon and porcupine were achieved but less successful results against pig. Several hundred baboons were poisoned by native authority workers in the Shinyanga district.

73. In the west, particularly in the neighbourhood of the swamp on the Kagera river, locusts have been present in small flights almost throughout the year: early in January and again in November the few natives in this lightly inhabited area had to be organized for action against hoppers and the destruction of egg masses which might otherwise have damaged their crops; these measures were entirely successful.

74. The parasite *Striga* weed continues to do much harm to grain crops, and though all natives understand the control measures advocated they are frequently too lethargic to carry them out before the weed has seeded.

75. Antestia and Thrips made an appearance in Bugufi coffee in greater severity than before. The measures for the control of *stephanoderes* in robusta coffee in Bukoba are being continued with conspicuous success.

76. Crickets again did severe damage to cotton in Bukoba, in some cases reducing a stand of young cotton by as much as 60 per cent. Sukumaland cotton was reasonably free of all pests and diseases; but the long expected arrival of pink bollworm in the Lake province occurred in the Musoma area. This causes much anxiety and while it is doubtful if the pest can be eradicated, measures are being taken to prevent its further spread.

MARKET IMPROVEMENT AND C'ROP GRADING

77. *Bukoba Coffee*.—Dealers licences under the Coffee Industry (Registration and Improvement) Ordinance were issued to 5 Europeans, 96 Indians, 72 Arabs and 682 Africans by the District Coffee Licensing Board. The Agricultural Officer, Bukoba, reports: "As a result of two seasons' work there has been great improvement in methods of handling and storage, it is felt that this improvement which is progressive, has justified the time given to it. In the trading centres the majority of dealers now have adequate stores with cement floors, and many village dealers also."

78. Particulars of coffee passing through the grading sheds is given below :—

Table of Inspection

COFFEE (in bags of 200lb.)	G.A.Q.	Graded F.A.Q.	Triage	Rejected	Total exported	Revenue collected
Arabica	1,577	25,960	—	4,558	28,791	Shs Cts 10,004 70
Robusta	1,077	78,260	402	8,367	79,739	26,311 20
				12,925	108,530	36,315 90

Rejected, 10½ per cent of total offered.

79. The percentage of rejections has fallen from 26 per cent in 1935 to 17 per cent in 1936 and a further reduction to 10½ per cent has taken place

in 1937. The principal factors contributing to this progressive reduction are considered to have been the steady progress maintained in control of bean borer and general improvement in the preparation and handling of the crop. The service has operated smoothly and there were no appeals from the grader's decisions. Some trouble was experienced with consignments of plantation coffee containing an admixture of washed native coffee, which required especial vigilance on the part of the grader.

80. *Bugufi Coffee*.—All coffee grown in Bugufi is prepared and sold by the Bugufi Coffee Co-operative Society; the successful purchaser was an East African firm who took the whole crop delivered in parchment at Bukoba at a most satisfactory price.

81. *Biharamulo Tobacco*.—The native authority handled this crop of which the carry over from 1936 amounted to 8 tons valued at £424, while the 1937 crop which has been marketed to date amounts to 23 tons valued at £1,596, a total value during the year of £2,320. Added to this must be the value of fire-cured coil sold locally by the producers. Coil owing to poor preparation in the curing barns has represented a large proportion of the crop. Biharamulo fire-cured coil is in demand among Bukoba native consumers, and is sold at a premium over ordinary native cured tobaccos.

82. *Sukumaland Produce and Cotton Markets*.—There are in the Lake province 29 markets at which produce alone is sold and 28 markets at which produce and cotton are handled. These 28 markets consist of eight produce (cotton) markets in which there are middlemen cotton buyers besides ginner cotton buyers and produce buyers, and twenty produce (ginners) markets at which there are no middlemen cotton buyers.

83. During the year all markets in which cotton is sold were laid out on a uniform plan which is capable of immediate extension to accommodate up to eighteen buyers should production warrant it. The number of buyers is however at present limited with the object of securing, other things being equal, approximately 100 tons of seed cotton per buyer. Owing to the impossibility of obtaining the necessary large quantities of building material before the opening of the 1937 market season, all the permanent buildings could not be erected, but from the one completed market and from the layout and spaciousness of the others it was possible to realize the great improvement which this design permits towards the quick and orderly disposal of produce.

84. The advantages of the market system to the seller lie in the display of prices, insistence on produce being purchased by weight and the availability of literate market clerks to assist him in his dealings. The advantages to the buyer should lie in the inspection of produce at the entrance to the market.

85. The markets are financed by the native authorities and stall rents are charged; large amounts are so received by the native treasuries amounting in the five districts to £2,131 and £1,395 for produce and cotton respectively. A conservative estimate of the turnover at the markets gives sums of £82,725 on the produce side and of £94,836 on the cotton, and calculating on these figures the rents represent a tax of but 2·5 and 1·4 per cent respectively on the turnover, which would have been less had not the markets been closed before the end of the rice season. It is estimated that but half the paddy crop passed through the markets this season.

86. The quantity of produce sold through the markets is given below (the cotton is divided to illustrate the quantities sold at the two different types of markets, i.e. the cotton markets where ginners and middlemen buy and those confined to ginners only) :—

DISTRICT	No. of produce markets	Ground- nuts	Sesame	Paddy	Gum	No. of cotton markets	Seed cotton, cotton markets	No. of ginners markets	Seed cotton, ginners markets
		Tons	Tons	Tons	Tons		Tons		Tons
Mwanza	20	1,813	119	3,147	—	4	2,016	10	2,489
Kwimba	8	1,711	36	626	77	1	545	3	879
Maswa	6	1,746	6	1	7	3	2,042	2	761
Shinyanga	10	2,336	—	—	344	0	—	3	606
Musoma	13	566	255	180	—	0	—	2	342
Total 1937	57	8,172	416	3,954	428	8	4,603	20	5,077
Total 1936		10,910	548	7,600	279		15,000		
Increase or decrease		-2,738	-132	-3,746	+149		-5,320=35·4%		

87. In addition to the 28 produce cotton and produce ginners markets, ginners were again permitted to purchase seed cotton from natives at their ginneries, and also, in areas of low production and particularly in the zoned areas of Shinyanga and Musoma, at pioneer buying posts. The quantities of cotton so marketed are given below :—

DISTRICT					Number of ginneries	Seed cotton bought	Number of buying posts	Seed cotton bought
Mwanza	...	...	...	...	5	Tons 2,524	5	Tons 226
Kwimba	...	...	...	...	3	936	1	21
Maswa	...	...	...	...	1	725	0	—
Shinyanga	...	...	...	...	2	1,200	12	819
Musoma	...	...	...	...	1	403	8	100
Total					12	5,788	26	1,166
Total 1936					...	9,696		
Increase or decrease					...	-2,742 = 28·2%		

The quantity purchased at the twelve ginneries represent 34·7 per cent of the whole crop.

88. *Western Province.*—Markets in many ways identical with the Sukuma-land produce markets exist in the Western province and in these groundnuts

and paddy are sold; the system is however not developed to anything like the same high standard as has been achieved in the Lake province. No records are available as to the quantity of produce handled.

FACTORIES DEALING WITH AGRICULTURAL PRODUCE

89. *Coffee*.—Two coffee curing works functioned in the Bukoba district during the year, a third has been sanctioned for the 1938 season. The two which were in operation had the heaviest season's work ever experienced by them; owing to labour shortages towards the end of the season natives and petty native dealers unable to effect their hulling in the usual manner took to selling dried cherry; despite this only eight per cent of the crop passed through the curing works.

90. *Cotton*.—The Ginnery Inspector made 65 visits of inspection to the twelve ginneries, two of which were not licensed for the year. One ginnery was entirely rebuilt, and four others increased their ginning capacity. The only ginneries which experienced stoppages owing to engine trouble were those equipped with steam engines. All ginneries are now equipped with permanent labour lines complete with cooking and sanitary facilities. No accidents have occurred in the ginneries during the year. A dust extractor hood was obtained and tried at several ginneries, its fitting appreciably improved working conditions on the gin floor. A double roller gin of foreign make, modelled on the Middleton gin, failed to give satisfactory service. Only one case of bad ginning was observed.

91. *Rice Mills*.—New rice mills have been erected at Bukene (Nzega) and Lusahanga (Biharamulo); in each case oil mills for the extraction of groundnut oil are attached.

PROGRESS TOWARDS IMPROVED FARMING METHODS

92. Early in this review the main problem before the department was outlined, in later sections the work on the immediate objectives has been detailed. The technical and educational work, which includes production of improved seeds, and trial of new methods; classes and demonstrations for individuals and widely different groups of people; introduction and instruction in ploughing; essential work against erosion without which no permanent settlement is practical, and finally the progress made with regard to the cultivation and controlled marketing of individual crops has been discussed. It now remains to comment upon the advances towards the major objective. This was done in last year's review by detailing those advances made at each centre where groups of peasant holdings had been established, a slightly different method will now be followed.

93. Calculation as to the gross wealth of the people leads one to believe that their income from agricultural produce is represented by Shs 20/- or 30/- per taxpaying male. The gross return is known to be very considerably higher in Bukoba, but these people are employers of labour and importers of cattle, the money thus spent being redistributed in the (poor) districts of Biharamulo and Kibondo, and in Sukumaland. If our farming methods are to be a success a higher cash return must be looked for, as the adoption of these farming methods necessitates the employment of capital in the form of ploughs and stock. Throughout the circle individuals who are following some if not all the ideal requirements have been watched and recorded so that we

know the energy they have expended and their cash returns. These records are tabulated below; the 1936 returns from the same holdings being given for comparison:—

Actual Cash Return

				1937	1936
				Shs	Shs
1	Ukiriguru	1 }	Mwanza av.	{ 37.00	Average { 65.00
2		2 }		{ 37.00	
3	Lubaga	1 }	Shinyanga	{ 33.60	94.00
4		2 }		{ 32.64	119.00
5	Ibadakuli	1 }		{ 66.24	75.00
6	Mwanhala	1 }	Nzega	{ 93.41	new
7		2 }		{ 94.09	new
8	Tumbi	1 }	Tabora	{ 54.65	new
9		2 }		{ 73.55	new
				Shs 522.18	Shs 418.00

Average of nine, Shs 58/02; average of five, Shs 83/60

94. Thus by nine recorded peasant holders a cash return of Shs 58/- or nearly double the estimated income of the average native, has been obtained; in addition at all centres it is reported that ample food supplies were harvested and that satisfactory reserves of root crops are in the ground. The Mwanza and Shinyanga peasants suffered as did their confreres in the district from poor cotton crops.

95. The numbers of settlers at Nyamahona and Buhungukira has increased materially; while on the more controlled areas new holdings have been taken up at Ibadakuli and Tumbi. No great store is set on the reliability of these advances as a record of the appreciation of the system by the average cultivator. Of more importance is the request of natives living near the Tumbi settlement to have their holdings reallocated to them on peasant holding lines. It will be remembered that this request occurred also at Ukiriguru when the scheme was started there, but that the practical difficulties encountered prevented it being put into effect; it is hoped that with the less congested conditions near Tumbi a solution to the difficulties will be found.

96. Advances which are meritorious and most encouraging are to be recorded from Shinyanga where five natives have come to the agricultural officer and requested advice and assistance, acting on this advice on their own holdings they have contoured the fields, and adopted manuring and rotations; each of the five has purchased a plough, one a double-mould-board plough in preference to the normal single-mould-board plough, in order that he may ridge cultivate his fields. Similarly there are in the difficult Bukoba district a few natives who have requested advice on contouring, pruning and other practices which have been advocated, and who after receipt of such advice have carried it out in a workmanlike manner. Such individual voluntary requests for the advice and help of agricultural officers are most encouraging, for we can be more confident that work so applied will be discussed freely and with discernment by the applicant with his neighbours and friends and will be so advertised over a wide area.

CONCLUSION

97. The Provincial Administration and officers of technical departments, in the Lake and Western provinces alike, have freely co-operated with the department and have communicated ideas, suggestions and practical assistance. To them on behalf of the staff I acknowledge indebtedness. To those officers of the Administration who have served in districts in which the department has not been adequately represented for part or the whole of the year, my special thanks are due for their assistance and for the extra work which the supervision of our African staff and other functions has given them.

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II.—ANNUAL REVIEW OF THE NORTH-EASTERN CIRCLE FOR THE YEAR 1937

(NORTHERN AND TANGA PROVINCES)

1. *Staff*.—On account of leave movements there have been changes of staff in the Moshi, Tanga, Lushoto and Same districts. During the last six months the Lushoto district was without a relief and has been supervised by the Agricultural Officer, Tanga. Only one Agricultural Assistant under the Agricultural Officer, Moshi, is now stationed on Kilimanjaro.

Five of the districts are well staffed with departmental African instructors, assisted in four of them by staff paid for by the respective native authorities. The coconut belt on the coast and the Mbulu district up-country, however, are in need of additional staff.

2. *Weather and Rainfall*.—The short rains at the end of 1936 were generally scanty and in some areas negligible. There followed a very dry spell of two and a half months with higher temperatures than usual. The first heavy showers of the main rains came at the end of March and continued with exceptional intensity until the end of May. From June to September the weather was dull and cloudy with no rain. The short rains which began very early in October with deluges on the coastal belt and heavy showers inland continued into December. An abnormal feature of these rains was that they came from an easterly direction, more nearly that of the long rains. These rains fell on the plains as well, whereas normally they fall more on the upper areas on the north and north-eastern slopes of the mountains. In brief the feature of the weather for the year has been the intensity of the rainy periods with a marked absence of showers in between and the earliness of the short rains.

GENERAL REMARKS ON CROP PRODUCTION

3. The yields of grain crops in the short rains planting areas were poor. Annual crops grown in the long rains gave disappointing yields and were not as good as in the previous year. However in the Handeni district the season is the best that the area has experienced for many years.

4. The export of sisal each month has been greater than heretofore. Despite the fall in price which occurred towards the end of the year, the season was a very good one for the industry and estates have accordingly been exceptionally busy making up on the leeway caused by the depression. Production constitutes a record and labour therefore seems to be fairly well up to requirements in most cases. The season has been very favourable for the establishment of new clearings as well as for good leaf growth on the producing plants.

5. Coffee production is less than the record year of 1935 and is disappointing after the exceedingly poor crop of last season. A great deal seems to depend upon the weather during the period about November; the short rains of the 1936 season did not begin until the end of December and the entire flowering took place unseasonably in January and February, followed by one of the poorest cropping seasons we have had. At low and medium altitudes there

was dry weather from January until the middle of March accompanied by abnormally high temperatures, resulting in a severe outbreak of thrips.

6. The abnormally wet weather in April and May delayed the ripening of the crop, but this was offset by hot dry weather in August and September which brought on ripening very rapidly ; a big proportion of the total crop was taken off the trees in one picking. Heavy downpours in October, resulted in severe loss of cherry. The early removal of the crop with adequate rains coupled with a good flowering during the most favourable period promises well for next season.

7. There has been a fall in cotton production due mainly to unfavourable weather in all districts but two. In particular the plantations at Kiru under the rift wall have again had a bad season ; the area is well above the average in fertility and can command irrigation water but there cotton runs to vegetative growth and is prone to pests and diseases. In contrast native grown cotton on the dry flats only a few miles away grows more true to type and is quite healthy. It is obvious that planters in the Kiru area cannot continue with cotton under these conditions.

8. Some extension in the cotton area in the Arusha district has taken place due to its being interplanted in young sisal, but no extension of cotton is anticipated in this part as a main farm enterprise. It is advisable that it should take its place as a catch crop on sisal estates or as a rotation crop with maize and perhaps groundnuts. Much less plantation cotton was grown this year in the Moshi district and there was a high incidence of internal boll rot.

9. Except for the Handeni and Mbugwe areas where the crop has a shorter growing season and ripens earlier, the other districts were handicapped by the onset of rains during picking as well as a sporadic occurrence of internal boll rot.

10. The plantation maize industry in the Moshi district continues to develop. Prices were good for the second successive year but unfortunately the crop was much below average. There was a big demand early in the year for maize in the Arusha area for which there were no supplies except by drawing upon Moshi and Mbulu. This has stimulated local interest in the crop and a ton of quick maturing Muratha maize seed was imported by planters from Kenya, to grow as a short rains crop. These growers are grouping themselves into an association with the idea of combining with the Kenya Farmers' Association who have already an affiliated association in the Moshi district. Maize is a staple food of the people on Kilimanjaro and Meru but, although cattle are stall-fed in these areas, all the manure is applied to the banana groves ; efforts are being made to induce the people to apply manure to their arable fields.

11. Wheat has been grown both by Europeans and natives on a small scale in the Arusha district for many years. For the first time an appreciable export of about two hundred tons of Kenya Governor wheat has gone out of the district. This production is the outcome of an issue by the department of fifty bags of wheat seed in 1934, the conditions of issue being that an equivalent amount should be returned after harvest. From this another issue was made in 1936 to the Engare Ol Motoni area where good yields of eight bags an acre of heavy grain have been obtained. The crop sold readily at between Shs 16/- and Shs 20/- per sack, which with such good yields must be a profitable

turnover. The crop is also being popularized in the Meru and Mbulu areas. Small hand threshing machines are now being used.

12. Sugar production on the estate at Arusha Chini continues steadily; between two and three thousand acres are now under cane. The factory is equipped to prepare white sugar. Arising from the International Sugar Conference sugar export quotas have been allocated to the various producing countries commencing on the 1st September.

13. Good crops of onions have been raised on Kilimanjaro, Meru and in Mbulu. Though prices were lower than last year it is still an attractive crop to grow. Each year there is a steady development at the lower elevations on Kilimanjaro spreading from the area where onions were originally introduced.

14. European potatoes are becoming a staple food crop amongst the natives of the western Usambaras. Exports from this area amount to nearly 200 tons. In contrast to this the Northern province imports a quantity of potatoes annually, despite the fact that there are parts of it very suitable for growing them. Sweet potatoes and cassava are now thoroughly established in most areas though precautions still have to be taken to ensure that all families have their plot of reserve food in those districts which are prone to poor grain harvests.

15. The citrus crop from Muheza was less than last year by some fifty tons. Oranges can be purchased in this area the whole year round but it is only in the height of the season that buyers come in from Mombasa and take the bulk of the crop for export. Grapefruit from the citrus station has been on sale at native retailers' stalls in the Muheza market for the purpose of propaganda. Natives understand the value of oranges and it is desired that they should be able to get to know the value of grapefruit.

Considerable interest is being taken in budded citrus by the managements of sisal estates in the Tanga area now that we are able confidently to advise upon stocks and varieties most suitable to the conditions. Several estates have put down their own nurseries and others secured planting material either from the Sisal Experimental Station or from the Muheza Citrus Station.

16. No significant increase in the export of kapok can be expected for a few years; new areas have been planted recently but these are not yet in bearing. The season has been favourable and a better harvest obtained than last year.

17. The export of copra has been well maintained. Prices were good at the beginning of the year and stimulated production but later there was a heavy fall which caused a decrease in production during the last six months. Additional to the amount exported nearly two thousand tons were absorbed by the local crushing works in Tanga. A new factory equipped for the production of edible oils was completed early in the year and the crushing plant came into operation during August; this concern pays a premium up to fifty cents a frasila for the best quality. Native producers near the mills prefer to sell wet copra to the company which stores it until it is sufficiently dry to crush, but the oil is not good enough for edible purposes and is used in soap making.

18. Pyrethrum growing has reached the commercial stage on one plantation in the western Arusha district. Pyrethrum dust is also produced. It is hoped that this very enterprising lead and example will be followed by development on the part of others, especially as it may be confidently predicted that pyrethrum will come to be extensively used on coffee estates.

SOIL EROSION

19. Simple Native Authority Rules were applied in the Usambara, Pare, Meru and Mbulu districts. There have been a few prosecutions under the rules and the penalty of a fine imposed; in no case was anybody prosecuted and fined without having been warned once if not twice. The good effect these prosecutions had over the area in which they were made was most noticeable. In the areas where the rules have only recently been applied, departmental efforts have been concerned more with soil conservation work than with any other single activity. In the western Usambaras for example, more than half of the thirty instructors have been exclusively employed on soil conservation whilst the remainder have assisted when their other special duties permitted.

20. There is very little progress to record in the Mbulu district owing to lack of staff to set a proper campaign going. Our experience in this erosion work has been that it needs very thorough attention and regular supervision to begin with if it is to be successful. Furthermore the problem in Mbulu is by no means easy since overstocking and a semi-dry zone are involved requiring careful handling. In Masailand, amongst the Sonjo tribe who practise irrigation on sloping land, large scale demonstration work has been carried out; this is being well followed up by the administrative officers concerned, as is most important since these people were ruining their small settlement and would have had nowhere else to move to.

21. Excellent progress has been made over the whole of Kilimanjaro which has received very favourable comment by many visitors. All those who have been concerned in bringing this about are to be congratulated on their achievement. Within the next few years these anti-erosion methods will be part and parcel of the natives' ordinary simple agricultural practices; the methods adopted do not clash with or disturb their economy in any way and the time will soon come when the existence of any rules connected with them will have been forgotten.

22. It is notable how the demarcating of steep valleys has effected the regeneration of bush providing a thick cover on slopes which were kept in a bare condition by goats and cattle only a few years ago. For definite infringements of the riverside rules a few prosecutions have been necessary.

23. Reafforestation communally and individually continues and each year selected sites are dealt with. Given a lead and some encouragement large numbers will willingly turn out and set about a hillslope which it has been decided shall be planted up.

24. Considerable progress to combat erosion has been made, with some exceptions, by planters in the Oldeani area following the good example of a few of the planters who realized at once that slopes cannot be farmed without protective measures and who followed the advice given them to protect their lands.

MARKETING

25. Mention was made in last year's review of the participation of East African coffee interests in the Empire Exhibition at Johannesburg. After the exhibition was over a representative for East Africa was appointed to continue with propaganda work. Available figures show that for the last half of the year 1936, East African coffees increased their shipments to South Africa by 69 per cent in tonnage above the average of four corresponding periods;

Tanganyika's share amounted to 15 per cent in tonnage. For the first time East African coffees imported into the Union exceeded the imports from Brazil.

26. When the Territorial Coffee Growers' Association was founded two years ago one of its main objects was: "To improve the methods of marketing Tanganyika coffee." As an outcome of this there has been formed this year the Tanganyika (East Africa) Coffee Growers' Co-operative Society, Limited, with an office and sample room in Moshi. This society handles planters' crops by acting as their selling agent, and with the consent of the sellers, bulks the lower grades of several lots.

27. The Kilimanjaro Native Co-operative Union adopted a new policy of marketing its whole crop on the East African market; instead of selling part abroad and part locally, as formerly. Half of the crop was sold through the medium of the coffee exchanges established in the middle of the year in Nairobi and Mombasa, and half was sold by private negotiation. The object in adopting this policy was to reach as large a number of buyers as possible and to spread the sales over a wider area than formerly.

28. The season opened with prices almost on a parity with the years 1932 and 1933; but when, in November, the market reacted to the new situation, created by Brazil's action in reducing the export levy, prices fell about twenty-five per cent.

29. During the six years of the union's activities the seasonal average prices realized for *parchment* coffee, in new bags, free on rail Moshi station, with coffee tax paid, were:—

Season		£	s	d		
1932-33	...	38	1	7	per ton for	1,070 tons
" 1933-34	...	35	0	0	"	1,168 "
" 1934-35	...	22	17	2	"	1,595 "
" 1935-36	...	23	7	7	"	1,791 "
" 1936-37	...	27	15	0	"	881 "
" 1937-38	...	28	1	0	"	1,400 " (estimate)

30. The marketing of the coffee of the two Arusha native associations was again by tender. The crop is estimated at 70 tons. Before the fall in prices two sales were held and 23 tons were marketed at 66 cents per kilogram parchment and 20 tons at 63 cents. Lately although 50 cents could have been obtained the growers preferred to hold their crop. The bulk of the small crop in the Usambaras fetched 72, 60 and 50 cents per kilogram for clean coffee sorted into three grades; other small sales were effected through small dealers at an average price of 50 cents per kilogram for clean coffee.

31. The marketing of plantation maize is largely done through the Maize Growers' Association with members affiliated to the Kenya Farmers' Association. Contracts renewable at the end of a year have been entered into with local sisal estates. There is no reason why a big local consuming market should not be secured.

32. In the Tanga province and Moshi district the whole cotton crop was purchased by one buying concern which paid slightly higher prices than the promulgated minimum. Prices varied through the season from 20 cents to 18½ cents per kilogram in the above zone and from 22 cents to 18 cents per kilogram in the Mbugwe zone. The value of second quality cotton was very low this year at 5 cents and 6 cents per kilogram and there was little inducement for growers to market it. Instead of holding markets at each centre once

a month the buyers increased their staff and arranged to buy once a week; this was much more convenient for the growers. The markets in all districts operated smoothly without complaint although natives were naturally disappointed that prices were lower than last year but realized that they were no worse than a few years ago. The crop was marketed in two grades which is much more satisfactory than having three grades even though this year there was such a price discrepancy between the two qualities.

BOARDS

33. *Sisal Board*.—Meetings of this board were held at Tanga during the year.

34. *Coffee Board*.—The Tanganyika Coffee Board and the East African Coffee Producers' Committee each held two meetings during the year. The business included the following items:—

- (1) the appointment of an East African Coffee Representative in Johannesburg until the end of 1937 to follow up the publicity created at the Empire Exhibition in Johannesburg in 1936;
- (2) the centralization and unification of the registration of all coffee estate marks within East Africa;
- (3) the publication of statistics of all East African coffee exports as a supplement to the Kenya Coffee Bulletin;
- (4) the formation, in conjunction with the Coffee Trade Association of Eastern Africa, of Coffee Exchanges at Nairobi and Mombasa;
- (5) the proposed formation of an Inter-territorial Coffee Research Committee.

35. An Ordinance to make provision for the control of the Native Coffee Industry and the marketing of the products thereof came into force at the end of October. A native coffee board composed of the District Officer (chairman), the Agricultural Officer and two native coffee growers was established under this Ordinance for the Moshi district; it was ordered that all producers of native coffee in the Moshi district shall sell their coffee through the Kilimanjaro Native Co-operative Union.

CROPS AND CULTIVATION IN DETAIL

36. *Sisal*.—The following are the exports over the past four years:—

Province	1934 tons	1935 tons	1936 tons	1937 tons
Tanga ...	40,614	47,536	45,763	52,477
Northern ...	2,644	2,619	3,039	5,632
Total ...	43,258	50,155	48,802	58,109

Besides this 528 tons of twine and cordage valued at £16,753 were exported as against 2,316 tons in 1936 valued at £75,717.

37. The actual railings of sisal and tow during the period amounted to the record of 34,663 tons as against 31,537 tons last year. Of this 5,632 tons came from the Northern province estates compared with 3,958 tons in 1936.

38. Six months ago a fall in values began in many commodities due, it seems, more to lack of confidence than for any other reason. Sisal was no exception and by the end of the year the price of first quality was about £8 less than at the beginning of the year. Recently the market has been very dull

with buyers holding off, but it is anticipated that there will be a recovery in prices when buying begins again in order to replenish world stocks which appear to be low.

39. *Coffee*.—The following are the amounts of parchment coffee produced over the last four years, by districts :—

District	1934 tons	1935 tons	1936 tons	1937 tons
Arusha (with Mbulu) ...	1,316	2,914	2,577	779
Moshi ...	2,891	4,336	3,269	2,738
Usambara ...	172	179	118	121
Total ...	4,379	7,429	5,964	3,638

These amounts were railed via Tanga or Kilindini as follows :—

Port	1934 tons	1935 tons	1936 tons	1937 tons
Tanga ...	1,194	2,084	1,803	1,666
Kilindini ...	3,185	5,345	4,161	1,972
Total ...	4,379	7,429	5,964	3,638

40. The amounts of (A) estate and (B) native coffee produced for export over the past four years are as follows :—

District	1934 tons		1935 tons		1936 tons		1937 tons	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
Arusha...	1,271	45	2,829	85	2,529	48	736	43
Moshi ...	1,361	1,530	2,418	1,918	2,322	947	1,648	1,090
Usambara	152	20	167	12	106	12	111	10
Total ...	2,784	1,595	5,414	2,015	4,957	1,007	2,495	1,143
Grand Total ...	4,379		7,429		5,964		3,638	

41. The above figures which represent the movement of coffee during the calendar year do not give a true picture of the crop season. Nevertheless the totals given over four years are comparable; it is estimated that two-thirds of the current crop is still in planters' hands in anticipation of a recovery in the price.

42. It is estimated that about 4,000 tons have been harvested this season in the Northern province and this amount represents an average crop. Three hundred tons came from Oldeani, a new area in which young coffee is still coming into bearing. The Arusha production is between 550 and 600 tons, which is far short of the normal crop of round about 1,000 tons. The Usa and Tengeru areas produced about 450 tons representing a good crop. The Moshi district estate crop is roughly 1,200 tons, which is about average.

43. The coffee industry had enjoyed a short-lived spell of improved prices when a crisis was caused by the Brazilian Government reducing the export tax on coffee by no less than seventy-five per cent at the end of October. As a result prices fell heavily from £40 to £50, f.o.r. Moshi, for good average quality coffee, to as low as £25 to £30, but very little business is being done.

44. Prompt action in asking for relief for the industry was taken through the medium of the East African Producers' Committee and the various Governments granted concessions on railway rates; as a temporary measure during the present emergency, the export rates have been reduced by 30 per cent from Bukoba to the coast and by 15 per cent from Moshi. Also, harbour charges at Kilindini have been reduced from Shs 12/- to Shs 6/- per ton. The Conference shipping lines have also reduced coffee freight charges from Shs 72/6 to Shs 65/- per ton.

45. In some districts there has been difficulty in getting labour and this was especially troublesome at picking time. Due to the bad times which the coffee planters have been going through wages cannot be brought to the same level as in the more prosperous industries. It is more than ever obvious that yields must be materially increased and that the improvement of the environment of the plant and the use of selected seed or improved stock are most important.

46. It is known that the average yield is a low one and that there are big differences in actual yields of individual trees; there is the paradoxical position that coffee frequently overbears and yet does not bear enough. On this subject of yield the Agricultural Officer, Arusha, writes:—

"The Coffee Research Station is engaged on the isolation of high yielders for the production of seed and material for vegetative propagation: methods of easy and inexpensive propagation suitable for the planter are being explored. With growing labour difficulties and no present hope of any price increase the coffee industry should, it would seem, prepare to settle down to production on good areas, to farm high and to use whenever available high yielding stocks. A short cut to the obtaining of which would seem to be the starting of fairly large uniformity trials by each planter under his own supervision, in order to select mother trees for his own conditions."

47. It is interesting to record that the first consignment of a Maragogipe type of coffee grown on Kilimanjaro was marketed in London and fetched the excellent price of Shs 85/- per hundredweight.

48. *Native Coffee*.—A disturbing feature in native coffee production is the reduced yields during the years 1936 and 1937. Whereas during the years 1932 to 1935 the annual yield averaged 385lb. parchment coffee per 600 bearing trees (which appears to be a fair average for East African conditions) the yield dropped in 1936 to as low as 142lb. and in 1937 was 189lb.

49. Of the native coffee on Kilimanjaro the Agricultural Officer, Moshi, writes as follows:—

"The native crop was expected to reach 1,500 tons following the bumper crop of 1,700 tons in 1935 and the low crop of 800 tons in 1936. The heavy fall in production in 1936 was not altogether unexpected but a fall to less than half of the previous year came as a surprise. The prospects for 1938 are good; coffee which has borne well this season is in good heart, there is little die-back and trees everywhere after the rains of October and November produced new growth and flower while the crop was still on the trees.

"It is known that a large proportion of the coffee crop is produced by a smaller proportion of the trees, that is in any block of coffee there is a high percentage of permanently unthrifty trees, there is a mass of evidence to support this view. That this is true of the coffee population on any given block or estate must be accepted, and presents a definite problem which

should be capable of solution by scientific investigation. Many reasons can be advanced to explain the situation, and any or several may be the cause :—

- (1) the reason may be genetic ;
- (2) lack of uniformity in both early and late treatment of the plants and trees such as—
 - (a) initial planting of unselected seedlings,
 - (b) uneven planting depth,
 - (c) individual trees overbearing, causing die-back not only of the branches but also of the roots,
 - (d) supplies (a satisfactory method has not yet been found of replacing trees which have died),
 - (e) soil erosion ;
- (3) position in the plantations ; all trees cannot be equally well placed with regard to shade.

“Average yields of parchment coffee per acre on both non-native and native coffee is estimated at about 2·8 hundredweights, the native is slightly higher. When the number of estates and individual native holdings which invariably yield far in excess of this average are considered, a rough idea can be obtained of the area of coffee so uneconomic as to bring down the average yield to so low a figure. Some of this coffee is situated in areas where coffee growing should perhaps not be attempted but each year sees a reduction in the coffee growing in the marginal lands. There are therefore large blocks of well situated coffee, both non-native and native, which can only be a source of loss in energy and money to the owners.

“When soil erosion is a major contributory cause of unthrifty coffee, amelioration work must necessarily be slow ; further it would be impossible to isolate the various causes, as overbearing followed by *hemileia* and die-back is undoubtedly accelerated by soil erosion. ‘Overbearing’ is regarded, particularly by natives, as the cause of crop failure. Many have come to accept as inevitable that coffee will only bear once in every two or three years. Only continual propaganda and demonstration will disabuse them of this idea ; in numerous meetings both public and private, one bag of coffee per hundred trees every year has been used as a slogan. This is not an extravagant aim and is well within the reach of the majority of native coffee growers provided they change their practices. Yields of this nature and more are being obtained in particularly well situated plots and their numbers could be increased several times.

“Large areas need uprooting and replanting but it is considered that substantial increase in yields and consistent yielding can be obtained by a few simple improvements in these cultural practices, viz. :—

- (1) anti-erosion measures ;
- (2) better understanding of the principle of pruning ;
- (3) crop limitation particularly on young trees ;
- (4) spraying against *hemileia* ;
- (5) manuring.

“Anti-erosion measures are being undertaken on a wide scale, but this work is progressing more slowly in established coffee than on other crops. The reason being that the work is more difficult in coffee, also terraces and bunds are broken down during cultivations and are not remade. Clean cultivation during the rains is discouraged, this is an anti-erosion measure

readily adopted by the natives, slashing, at ground level, of rank weed growth is advocated. There has been a marked reduction in coffee irrigation during the past few years and therefore less erosion from this cause.

"Mistakes are made in too heavy pruning and pruning in the wrong season. Continual propaganda is bearing results. Many natives are making a real effort to prune soon after the short rains and realize the dangers of pruning bearing coffee in mid-season.

"The greatest difficulty is experienced in persuading natives to strip part of the crop from heavy bearing trees, they invariably agree that it should be done but rarely do so unless the work is personally supervised by the field staff.

"Bordeaux spraying has been demonstrated on native plots using ordinary bucket pumps, and a few natives now declare their intention of spraying against *hemileia* next season. Some of the better native coffee plots, adjacent to the house and receiving cattle manure, would not respond to bordeaux spraying, and such owners have been advised to continue good farming as the best means of tackling disease, but a very large proportion of the coffee particularly in west Kilimanjaro is remote from the house and cannot receive an adequate dressing of cattle manure, on such plots bordeaux spraying would be profitable.

"The recent disturbances in Machame and Marangu have not in any way affected the work of the department. The trouble, which at first appeared to be widespread has now practically ceased, and normal field work was resumed immediately after the trouble subsided.

"There has been a fall off in new plantings during the past year, the reason is partly economic but mainly due to lack of space which is inevitable in an area so thickly populated as the Chagga country. A return to higher coffee prices would undoubtedly see an increase of coffee planting in the banana groves where there is still room for further extensive plantings."

50. Throughout the year special propaganda encouraging manuring and mulching has been started amongst the native growers on Mount Meru. Response to this advice is slow as yet but it is expected that it will be adopted more readily when there are a sufficient number who have been induced to do it and so act as demonstrations to others.

51. *Coffee Pests and Diseases*.—The usual programme of block spraying against *antestia* was organized. Bordeaux spraying has been demonstrated on native plots on Kilimanjaro. Owing to continued high maximum temperatures the entomologist predicted a thrips outbreak which occurred in the middle of February and caused serious damage in some areas; Arusha had the worst outbreak known for ten years. Leaf-miner is a serious pest and in some places caused much defoliation of the trees; no satisfactory control measures have been evolved. The rains in October and November brought on *hemileia* much earlier than usual; most plantations are sprayed with bordeaux mixture as a routine measure. At the end of the year complaints were heard from many directions that *antestia* were numerous and difficult to control with arsenite sugar bait; pyrethrum dusting is to be used by several estates and the native growers on Meru. Borer control work has been satisfactorily carried out.

52. *Experimental*.—The work of the Coffee Experimental Station is reported in a separate bulletin as well as through Quarterly Notes. The station particularly urges that the time has arrived for the individual planter to take

part in the selections of "mother" trees. The work done to date has been confined to trees on the "uniformity" trials and this has given the required information to say exactly what points are necessary to characterize any individual tree. Experiments on four estates to find out the effect of nitrogen on yield and growth have yielded results. Other experiments have been put down on estates and native plots to find out the best way to supply the vacancies in old coffee and to discover the best methods of "top-working" old coffee, as well as trials dealing with irrigation, systems of pruning, spraying strengths against *hemileia* and the effect of composts. Interesting results are to be seen on the experiment where clean weeded, grass and banana leaf mulched plots are compared; the trees mulched with banana leaf look much superior to the others.

53. *Coffee Curing Works*.—The quantity of coffee treated during the year was 1,365 tons, including 365 tons of native produce. The quality of the curing compares well with other factories in East Africa and the Moshi works are receiving increasing support from the trade and planters. The use of the local works gives a saving in railway freight of between eight and nine shillings a ton.

54. *Tea*.—The production of made tea amounted to 157,726lb. as compared with 98,925lb. last year. On the chief estate areas of the tea had been rested and were out of plucking for some time; some of this has been pruned and brought into bearing again this year.

55. *Cocoa*.—Eight tons of cocoa valued at £60 per ton were exported from Sigi Segoma. Only very small blocks of cocoa occur elsewhere in the area and very little was produced by these.

56. *Kapok*.—The kapok plantations which are scattered through the Tanga, Pangani, Korogwe, Lushoto and Handeni districts have had a better season. The average export over the last three years has been 73 tons and this year is 77 tons. A small plant for crushing the seed has been installed and the oil is sold locally. The Togo as well as the common Java type has been planted but opinions are still very contradictory as to which is the better of the two. The variability of the yield within the two types appears to be very great.

57. *Cinchona*.—One and a half tons of bark off hybrid trees growing in the western Usambaras has been exported, valued at Shs 1,680/-. The estate exporting this bark has planted a further thirty acres of hybrid trees amongst old coffee, these young trees are very healthy and are growing well. The owner has mastered the technique of raising seedlings which is a difficult business and proposes to raise and plant out a million trees in the coming rains. In addition it is expected that there will be a surplus of 300,000 seedlings at five cents each for sale to other estates in the vicinity; already several thousand seedlings have been sold to estates from these nurseries.

58. A small nursery was maintained by the department at Lushoto. There are supplies of small quantities of *succirubra*, *ledgeriana* and the hybrid. It is very fortunate that we have a planter in the area who can raise seedlings for sale so successfully. It can only be done by constant attention which it is difficult for departmental officers to give as they are frequently away on other duties. Two separate trials at Arusha were not successful and it is believed that this is due to unsuitable soil. Seedlings raised at Amani have been supplied to an estate in the Arusha district for trial.

59. *Copra*.—Plant sanitation work has been the chief occupation of the small departmental native staff operating in the coconut area. An inspection

of all groves is necessary to keep the growers up to the mark. Such work has been rather easier this year than of late because of the better price for copra but the standard of maintenance of groves, however, is still not satisfactory. The general state of the palms is fairly good and crops have been well up to average. Considerable development in the processing side, reported in a previous paragraph, is taking place in Tanga and this should act as a stimulus to the growers.

60. *Cotton*.—The quantity of native grown seed cotton marketed this year was 3,991 tons for which £36,403 was paid to the growers, compared with 3,497 tons in 1937, but the carry-over from the 1936 season was 739 tons compared to 112 tons in the previous year. Four ginneries operated to deal with this crop and 11,162 bales were turned out. It is estimated that there are 300 tons yet to come in so that the crop will be about 500 tons less than last year. Most if not the whole of the crop is shipped to India and for the first time arrangements were made for ships to call at Tanga once a month provided a thousand bales were guaranteed. As a result a total of 1,334 tons of lint was railed from different points on the line down to the port of Tanga against 745 tons to Mombasa. It is anticipated next year that an even greater proportion of the total crop will be railed to Tanga.

61. Both the Handeni and Mbugwe districts had record outputs. The shortfall is spread over the other three districts and was mainly due to the unfavourable weather. Nevertheless the season has been by no means a bad one and it is not anticipated that it will in any way discourage production next season.

62. The production of plantation cotton was 409 tons compared with 728 tons last year. A smaller acreage was planted in the Moshi district. More was planted in the Kiru area than last year but the crop was most disappointing. The previous season was a bad one for these planters and with poor prices it is expected that there will be very little planted next year. The locality cannot be considered a really suitable one owing to the bad climatic effect for cotton of the rift wall which rises immediately behind the plantations.

63. *Maize*.—A total of 2,182 tons of maize were railed down the Tanga line from the Northern province, more than half of which came from the Arusha district. Only 339 tons were exported over the Kenya line. This is less than the previous year, due to the unsatisfactory season. In some quarters on Kilimanjaro the native yields were so poor that they have had to buy maize. An outbreak of army worm in April caused considerable damage to fields of late planted maize.

64. *Citrus*.—The citrus crop was smaller than usual. The dry spells first at the beginning of the year and then from June to September were very pronounced and the trees suffered accordingly. A planter near Moshi has been planting up an orchard of budded citrus of different varieties using various stocks; it is as yet premature to give an opinion as to which varieties are suitable for the conditions.

65. *Rice*.—Owing to the unfavourable rains, the export of paddy and rice from the growing areas was much below last year and totalled 500 tons of paddy and 337 tons of rice. The same rice area does not have to depend at all on actual rainfall since it is all irrigated, and production was satisfactory.

66. *Wheat*.—The cultivation of wheat is extending amongst non-native and native farmers. Kenya Governor variety is exclusively planted at present

but trials of Njoro bred wheats have been made by the Agricultural Officer, Arusha, who reports as follows :—

“Kenya Governor, susceptible as it is to two forms of black stem rust, has proved a very useful wheat for this area which has naturally certain conditions which must be studied by the wheat grower. These are mainly—

- (a) the need for an early maturing wheat which can be planted after the long rains have begun to tail off in May;
- (b) a wheat resistant to leaf rust common at low altitudes;
- (c) a variety resistant to stem rust (Kenya Governor is resistant to one out of the four known Kenya types. It is not known what physiologic forms actually exist here.);
- (d) a wheat which crops well on light land, Kenya Governor appears very satisfactory in this respect; and
- (e) general vegetative characters of straw strength, and resistance, non-shattering type and so on which are desirable but not fulfilled by Kenya Governor.

“Kenya Governor remains the favourite low altitude wheat in Kenya and for some time it is anticipated that it will prove the best variety here for altitudes between 4,000 and 6,000 feet.

“In 1937 trials were started in the district which had as their object the collection of information bearing on wheat diseases, in particular black stem rust, and also the estimation of the value of new Njoro selections of rust-resistant wheats for local conditions.”

He concludes by saying :—

“The work this season on wheat has indicated that two of the Njoro varieties B256G and 58F(Li) are suitable for cultivation in this district at medium altitudes, 4,600 to 5,200 feet. These varieties provide stem rust resistant material for the planter which places wheat growing, in the higher altitudes particularly, on a safer basis than was ever considered possible at one time.

“Yield trials of these two wheats with local varieties are now required while further observation on the behaviour of these and other Njoro wheats should be continued and the scope of the work extended to Mbulu district. Rust observations can be recorded in many localities with the testers obtained from Njoro and this work should also be extended.”

67. *Papain*.—Two estates in the Arusha district have produced during the year whilst planting has gone ahead on two other properties. On a field scale losses occur in planting out from a type of blight and foot rot. It has been found, however, that planting seed in the dry season in heavy clay soil on fresh ground results in strong seedlings; these are removed with soil and planted out in the field.

68. *Fodder Crops and Cattle feeds*.—The Agricultural Officer, Arusha, reports on this as follows :—

“It is pleasing to record that one of the most prominent dairy farmers who previously grew nothing for his cattle is now a confirmed believer in Napier fodder and lucerne.

“Four acres of Napier fodder and about five acres of lucerne supplemented with cotton seed enabled this farmer to bring cattle through without serious decline in condition. Large numbers of cattle were to be fed but the use of cotton seed plus the succulent available made all the difference.

Cotton seed alone with the dry veldt grass would have been too costive for the animals.

"It is hoped that the surrounding farmers who had no butterfat to sell at the end of the dry season will grow fodder crops themselves next season. This office was indirectly responsible for the consumption on cattle farms in the district of some twenty tons of cotton seed for the first time."

69. We have extensive areas in the Northern province suitable to mixed farming. Despite such possibilities the imports into Moshi alone of sundry products is considerable; bacon and ham imports are valued at £421, fresh meat at £244, tinned meat at £261, butter at £412, cheese at £247 and ghee at £1,495. Butter to the value of £125 is exported.

70. *Other Products*.—Mixed results have been got from the ramie plantings in various localities. In general it may be said firstly that the distribution of rainfall in most places is not sufficiently good to give the best results, also there is no doubt that good yields can only be maintained by very intensive farming. Stripping by hand to obtain "ribbons" cannot be done profitably and the decorticating machine tried cannot turn out either a product to compete with "China grass" or give a sufficient output. It is understood that a new method of decortication is to be demonstrated in the near future. A note on trials of ramie was published in the *Agricultural Journal* by the Agricultural Officer, Tanga.

71. The owners of the existing plantings of *Derris elliptica* of the Ceylon strain and one plot of *D. malaccensis* have been persuaded to uproot and destroy them, receiving in return supplies of cuttings of the Amani strain of *D. elliptica*. The importation of *D. malaccensis* is now prohibited. The Amani strain is so good that the advantage to the Territory of having no other kind, is of supreme importance when the time comes for exporting roots. Analyses of the Amani strain show rotenone contents of 10 per cent and over with ether extract about 25 per cent. The value of derris to-day is given as one shilling and twopence per pound for root with rotenone content of 6 per cent, but if below this figure the value is no more than sixpence per pound. There has been a big demand from planters in all areas for cuttings of derris from Amani, mainly to find out how the plant thrives and to discover suitable methods of harvesting the roots.

72. The output of equellor oil from Sigi Segoma estate was 4,704lb. valued at Shs 23,522/—, compared with 5,891lb. worth Shs 19,159/— last year. The price realized averaged about Shs 8/— per pound c.i.f. During the year a distillation plant for the manufacture of petitgrain oil was erected and several trials have been carried out by the estate in co-operation with Amani to determine what method of distillation gives the best results. No shipments of petitgrain oil were made. A little neroli oil was made in a small experimental still; this will only take a charge of one kilogram of orange flowers which is too small for commercial purposes and it is now proposed to install a special unit for the production of this article. Experiments in the preparation of ylang-ylang (*Cananga odorata*) oil have been made with the small experimental still and a nursery of ylang-ylang trees is being prepared from seed obtained from one or two trees which exist on the estate; this has possibilities, for the best quality oil fetches up to 400 francs an ounce in Paris.

73. The oil palm plantation above Mubeza produced 30 tons of palm kernels and 15 tons of palm oil.

74. The cultivation of oyster nuts (*Telfairea pedata*) in the western Usambaras is being watched with much interest. It is reported that a consignment of nuts has been valued at £110 a ton c.i.f. Europe. There seems to be good possibilities for the extension of this crop since it is grown in many areas by natives so that the conditions under which it flourishes are already known.

75. Following on development in Kenya, several planters in the Usambaras have become interested in passion fruit. Small-scale production of "home-made" passion fruit juice has been undertaken by two or three growers and planters now wish to go in for this crop on a larger scale. An association has been formed and discussions regarding the erection of a factory are in progress.

76. Tobacco exports to the coast from the Usambaras remained steady at about 30 tons, composed almost entirely of native production. One estate prepared a little fire-cured leaf grown from Heavy Western and Itheme Special varieties. A planter in the Moshi district prepared 94,075lb. of pipe tobacco and 113,155lb. of cigars and cheroots. Some of the leaf is grown locally, the rest at Babati, Kiru and Lushoto. The wrappers and binders for the cigars are imported from the Dutch East Indies. The leaf is not yet flue-cured but a new factory and barns are being put up to do this.

77. Thirty acres were planted to cotton in an area at Kahe selected for cotton experimental work. Certain Egyptian, one American and another variety from Kenya were included in a main plot of our own bulk seed. The purpose, in these initial stages, is to discover the suitability of the area as a site for a future experimental station. It is desired to ascertain, first of all, the status of the principal pests in the neighbourhood. A visit to the station was paid in August by the Entomologist. He found that the cotton grown in this Acacia-Baobab area was significantly more stained than that grown under different conditions in the Morogoro area. He is of the opinion that other bugs besides stainers are responsible and if so that the presence of baobabs in the area is of no significance from the point of view of early staining. The introduced cottons all suffered in varying degrees to jassid infection whereas our bulk crop was remarkably free and therefore resistant to it under these conditions. Observations during this visit indicated that the area is liable to all the common cotton pests but that none are chronic.

78. Yields were disappointing both as to quantity and quality. A boll count made in November showed that 90 per cent of bolls were spoiled by internal boll rot. Counts made at the same time on native plots within a radius of fifteen miles varied between 22 and 70 per cent. There is no doubt that it has been an exceptional year for this type of damage: the most peculiar feature of it being the sporadic nature of its occurrence.

79. Soya bean variety trials were carried out on a small plot in Moshi. Ten selections were obtained from Potchefstroom, five varieties from the Kenya Department of Agriculture and one variety originating from Kenya which has been grown one season already here. The Potchefstroom selections were all dwarf and similar in vegetative characters, producing yellow seeds of rather small size. They were quick maturing but yielded very lightly averaging 79lb. per acre. Some of the Kenya varieties originated from Java. Greenish Yellow, a fodder type, matured in 125 days and yielded at the rate of 484lb. per acre. Busa, also a fodder type, matured within the same period and yielded small, flat, brown seeds at the rate of 357lb. per acre. Haberlandt is a dwarf variety producing seeds somewhat bigger than the South African selections;

this variety matured in 85 days and yielded at the rate of 102lb. per acre. Brownii, Oo-too-tan and the earlier importation all yielded very poorly. All these selections will be sown again for further observation and acclimatization.

80. The Agricultural Officer, Tanga, reports on the Muheza citrus station as follows :—

“A further small area has been brought into cultivation for raising citrus stocks for which there has been a greatly increased demand from non-natives. Rough Lemon is now the only stock used for grapefruit and oranges. Tangerines are budded on local tangerine seedlings. All the stocks now in the nursery are booked up, and although propagation is being undertaken as rapidly as possible with the small labour force available several substantial orders will not be completed before the long rains of the year 1939.

“Triumph has again given the best results of the five grapefruit varieties; the other four being Duncan, McCarthy, Marsh's Seedless and Foster. Several young trees of Foster grapefruit have been planted on the plot to give this variety a fuller trial. The comments on orange varieties made in last year's report are equally applicable this year. Propagation of oranges is now being confined to four varieties: a local selection, Mediterranean Sweet, Ruby Blood and Valencia Late. Two varieties of tangerine, a local selection, and the Cape Tight-skinned, are being raised.”

81. He reports on the Native Authority Farm at Lushoto as follows :—

“The coffee on this plot is poor except on the bottom terraces. About three bags of parchment were harvested from five acres of trees three and a half to four years' old. More shade is required. *Leucaena glauca* is being sown to obtain a quick shade, and *Rauwolfia* sp. is being planted for permanent shade. Compost is being applied to the coffee as fast as it can be made.

“The deciduous fruit trees have also made rather disappointing growth, except for a few individual trees which are doing very well.

“The area under elephant grass (*Pennisetum purpureum*), guinea grass (*Panicum maximum*) and Uba cane have been extended, and will be further increased as planting material becomes available. The lucerne has done moderately well.

“The five cows are in good condition, they are partly stall-fed. Four of the cows are in calf. The calves will be sold off, for five head of stock should provide enough manure and compost to keep the place in good heart.”

82. The Handeni seed farm has been useful for distributions of seed of Black gram, Feterita millet, Red millet, Bullrush millet, White Congo maize and groundnuts. Pigeon peas were grown on land which had to be cleared near the station and two tons of seed were distributed to natives.

83. Of the peasant holding situated on the lower altitude zone near Moshi the Agricultural Officer, Moshi, writes :—

“The peasant holding is continuing to make good progress, and to demonstrate that a good living can be made by a Chagga native in the foothills of Kilimanjaro. Ten cattle are now housed in an improved cow byre the milk being sold in the township. A banana plot is kept in a high state of fertility, maize and beans are the main crops for food and sale. Elephant grass, Uba cane, edible canna and Mauritius beans are grown for

fodder : the first three receive dressings of cattle manure ; this was considered a revolutionary idea by the peasant, but results have now proved to him that it is worth doing. The cows also receive a ration of three pounds of cotton seed per day with good results in maintaining milk yields. Good Rhode Island Red poultry are also kept."

84. The peasant holding settlement for tuberculosis convalescents under the charge of the Medical Officer at Kibongoto hospital has made excellent progress. Oxen have been bought to do communal ploughing and the usual arable crops and vegetable gardens have been planted. Cattle are installed ; grazing is provided and fodder crops of elephant grass and velvet beans are grown for extra feed. Banana groves have been established on each plot as well as small orchards of budded citrus fruits. By the end of 1938 the holdings should be going concerns and present a valuable demonstration.

PESTS, DISEASES AND VERMIN

85. Small swarms of red locusts passed through Handeni and Korogwe in August without causing any damage, at the same time large swarms of red locusts passed over the Masai and Mbulu districts in a westerly direction.

86. Damage caused to cotton by bollworm and stainer has been unusually heavy in the Moshi district this year : pink bollworm in the Kiru and Lushoto areas caused some damage late in the season and will require a strict observance of the close season if it is to be controlled. Internal boll rot was severe in many scattered localities. Stump rot, an unidentified disease of sisal, has been noticed on several estates on the coastal belt and is of particular significance at Moa.

AGRICULTURAL SHOWS

87. No agricultural shows were held during the year.

GENERAL

88. Sir Frank Stockdale, Agricultural Adviser to the Colonial Office, spent over a week in these provinces, visiting the research and experimental stations and parts of the Moshi district. The Director and Deputy Director visited the circle on several occasions. Mr Glover, Plant Physiologist at Amani, spent some time in the Moshi district investigating sisal roots having carried out similar investigations in the Tanga area. Mr W. V. Harris, Entomologist, toured certain cotton areas and Mr N. Field inspected the Sindeni, Korogwe and Moshi ginneries.

89. Despite the serious fall in prices of sisal, coffee and cotton which occurred in the latter part of the year from the point of view of progress and production the year has been a good one. The staff have not spared themselves in doing their share with others to bring this about.

R. M. DAVIES

*Senior Agricultural Officer,
i/c North-Eastern Circle*

III.—ANNUAL REVIEW OF THE SOUTH-EASTERN CIRCLE FOR THE YEAR 1937

(SOUTHERN PROVINCE)

1. Owing to leave movements it has been necessary to compile this report almost three months before the close of the year. As the marketing of many crops has not yet been concluded the usual comparative statistics are necessarily omitted. In several cases, however, indications of progress are already apparent and are noted in the report.

2. *Staff.*—Unfortunately the departmental staff has again been below the numbers required for the Southern province. Songea has had the services of two Agricultural Assistants whilst a third has been stationed in Lindi and has included the Masasi and Mikindani districts in his area. In addition, a District Foreman was stationed at Kilwa until the middle of March. The headquarters of the Senior Agricultural Officer were at Lindi. It says much for the good work that has been done in the past, and for the spirit of the people themselves, that with only this skeleton staff available no ground has been lost and further progress can be recorded.

3. The African instructor staff has remained almost constant and has carried out good work. Each district now has a nucleus of really useful men, part of whose duties is to train their more junior colleagues. Temporary additional men have been engaged for seasonal requirements.

GENERAL REMARKS ON WEATHER AND CROP PRODUCTION

4. Weather conditions gave rise to considerable anxiety in the early stages of the season. The position became more satisfactory than was anticipated and though drought in January and February minimized and retarded harvests in many areas, ample rains fell and another successful season has been experienced. Progress with the major crops is detailed later in this report. Here it is sufficient to mention that the production of sisal, groundnuts and tobacco has already reached a new high level whilst it is almost certain that sesame and beeswax will exceed their previous records before the year closes. The production of rice has been stable and cotton shows a healthy increase. The food crops alone have been poor and although harvests have been sufficient to meet the domestic requirements of the people the usual large surplus was not forthcoming.

INLAND AREA

Songea, Liwale and Tunduru Districts

5. *Songea District.*—This is the most interesting district in the province. Situated as it is, three days' motor journey from the coast and with an altitude of 4,000 feet above sea-level, inhabited by virile tribes occupying well watered and fertile lands, it provides almost unlimited scope for the agriculturist. More than this, agricultural staff can achieve more improvement in agricultural practice than in the coastal areas where attention is mainly given to production of the bare necessities of life. Little improvement in the standard

of living of either individuals or communities can be attempted whilst there remains any doubt as to the capacity of the people to provide themselves with food and without any lurking fear of a recurring shortage at longer or shorter intervals. Songea is alone amongst the districts comprising the province where this doubt does not exist.

6. The above serves to explain how, at the request of the Provincial Administration, two men are allotted to Songea, where the department is mainly concerned with the progress of two introduced crops, tobacco and coffee, both of which demand intensive application by those engaged in their cultivation and constant supervision by the department's staff. One Agricultural Assistant is stationed at Songea for tobacco, the other at Lipumba, his area embracing the hilly Umatengo country and extending down to the shores of Lake Nyasa; he deals mainly with coffee.

7. *Coffee*.—It has been the policy to allow this industry to develop slowly. This has resulted in a high standard of coffee culture amongst the growers almost all of whom are genuinely keen to receive instruction. It is seldom necessary to invoke the aid of rules and regulations and the danger of neglect is fully appreciated by the community at large. For purposes of the Coffee Industry (Registration and Improvement) Ordinance, 1936, a count of growers and trees has recently been made when the following figures were obtained :—

Number of growers	...	...	...	587
Trees in bearing—not Kent's	...	...	...	8,991
Trees in bearing—Kent's	...	...	...	13,400
Trees not bearing—Kent's	...	...	...	132,558
Total number of trees	...	...	...	154,949

No fresh nurseries were planted during the past twelve months but a supply of seed is on order for the present season.

8. The crop is now marketed through the Ngoni-Matengo Co-operative Marketing Union, Limited, and the coffee growers have been formed into a Primary Society. Part of the 1936 crop was placed on the London market for the first time and was sold as follows :—

"A" size	...	...	...	Shs 72/-	per cwt.
"B"	..	...	...	.. 52/-	..
"C"	..	...	...	.. 46/-	..
"PB"	..	...	...	.. 60/-	..
Triage	...	...	...	.. 40/-	..

All prices : London landed terms.

It is expected that the 1937 crop will amount to five tons.

9. *Tobacco*.—The steady annual increase in the production of fire-cured tobacco in Songea which has been noted since the inception of the industry in 1930 has continued, as the following figures show :—

		Kgs			Kgs
1930	...	830	1934	...	32,608
1931	...	855	1935	...	106,045
1932	...	1,897	1936	...	120,766
1933	...	6,537	1937	...	177,609

10. A greater insight into the true prosperity of the industry will be obtained from the following detailed comparisons :—

	1935	1936	1937
Average production per grower ; in kilograms	32·78	22·02	52·03
Average yield per acre ; in kilograms	132	88	208
Average price per 100 kilograms ; in shillings and cents	43/50	36/58	44/33
Average receipt per grower ; in shillings and cents	14/36	8/06	23/00
Total number of growers	3,226	5,464	3,421

11. In analysing these figures it is necessary to remember that 1936 was a poor tobacco year when disease was prevalent and quality indifferent. The present year has been an exceptionally good season from all points of view. The outstanding matter of interest is the production of a greatly increased crop by a substantially reduced number of growers. The majority of these people may now be considered to be established as regular planters. 1936 saw the influx of a large number of new growers and it was unfortunate for them that the crop was a partial failure. Many who had entered on the "get rich quick" theory forthwith departed whilst a further large body were disaffected with the marketing arrangements. The new season opened therefore with only a limited number of the keener older growers. It is a tribute to the position which Mr J. H. McGregor, the Agricultural Assistant, holds in this district that the number who eventually planted rose to the figure which it did. Thereafter the season was a story of unqualified success. On the experience of local conditions gained in previous seasons the planting date was retarded for one month with the result that, with the exception of a handful of growers who rejected the advice offered them, there was no loss from disease whatsoever. A great improvement was also apparent in the curing and handling of the tobacco and the marketing arrangements worked smoothly and well. It is the opinion of all who are concerned with the Songea crop or who have had an opportunity to see the work proceeding in the district that the progress and prosperity of this valuable industry may largely be credited to the skill, patience and personality of Mr J. H. McGregor.

12. *Marketing*.—The whole crop was bought by the Ngoni-Matengo Co-operative Marketing Union, Limited. The proportion of growers who have joined the union is rising rapidly and it is hoped and expected that nearly all the producers will become members before long. The fee for membership is only one shilling and there are numerous advantages to be gained, in addition to participation in whatever bonus may be declared at the end of each working year. There is nothing of particular importance to record regarding the marketing arrangements which worked well and gave general satisfaction. But the number of buying centres is already too large to enable a single buyer to get round sufficiently quickly, and there is the danger of the tobacco becoming over-conditioned in the producer's huts whilst awaiting sale. The following prices were paid :—

Grade	I	...	...	70 cents per kilogram
"	II	...	...	40 " "
"	III	...	...	20 " "
"	IV	...	...	10 " "

A total amount of Shs 78,740/70 was paid out to growers at the markets and it is anticipated that a bonus will be declared later in favour of those growers who are members of the union.

13. *Other Crops.*—The experiment of growing cotton on the shore of Lake Nyasa has been discontinued. The level of the lake has risen rapidly in recent years and the people have been fully employed in providing themselves with food and reconstructing their houses further inland. In the Umatengo country fresh potato seed has been introduced to replace the existing strains which were becoming exhausted. The growing of wheat is stated to be decreasing owing to the poor prices obtainable locally. It has been a good year for beeswax.

Tunduru and Liwale Districts

14. Tunduru has experienced the most prosperous season in its history. Cotton production, of which details are given later in this report, again shows a marked increase and there is no decline in enthusiasm for this crop.

15. In addition to cotton all crops and beeswax gave good returns. Large areas of the district are considered suitable for tobacco production when opportunity offers. There is an atmosphere of well-being and contentment about this district which is gratifying and significant of greater things to come.

16. The department is not directly engaged in the Liwale district at present though there is some suggestion of introducing cotton in the coming season. The collection of wild rubber on a small scale has continued.

INTERMEDIATE AREA

Newala and Masasi Districts

17. Masasi has had the benefit of part-time services from the Agricultural Assistant, Lindi, but no attention could be given to Newala. They are both sandy and mainly waterless districts and still cause anxiety regarding their capacity to be self-supporting with foodstuffs. In the year under report Masasi has produced an increased cotton crop and a bumper groundnut harvest has been gathered. In some areas however food supplies are again short and more attention is necessary to the planting of cassava and other reserve crops. Plans have been prepared for the introduction of cotton into that part of Newala which borders on the Mikindani district.

COASTAL AREA

Kilwa, Lindi and Mikindani Districts

18. The coastal districts have experienced another successful season and all the main cash crops have either maintained or exceeded their previous highest levels. Food crops have been sufficient but there is little or no surplus for export this year. Cashew nuts are receiving greater attention and a distribution of seed of the *Telfairea* (Kweme) nuts has been made. Non-native estates are all primarily concerned with the production of sisal but many are searching for suitable secondary products and beginnings have been made with derris root, tung oil, kapok and cashew nuts. Cotton is successfully grown in young sisal and though at current prices it may not show a profit by itself, it undoubtedly covers most if not all of the first year cost of planting sisal.

CROP PRODUCTION IN DETAIL

19. Before proceeding to review in detail the production of individual crops it is once more necessary to draw attention to the methods in use for calculating and recording the surplus production (i.e. exports) of the people inhabiting the

Southern province. The area is served by the three ports of Lindi, Mikindani and Kilwa. Only occasionally are these ports visited by ocean-going steamers permitting direct shipment to the country of destination. A large proportion of the area's exports are carried either by the three regular coastal steamers or by the large fleet of dhows which still exists. All shipments are recorded by the Customs authorities at the ports through which they pass under three distinct headings; viz.:—

(a) Direct exports.

(b) Goods moved to another port in the Territory for transshipment and direct export thence.

(c) Coastwise exports, i.e. to ports within the Territory.

The point to which it is desired to draw attention is that only produce leaving local ports under the heading (a) above appears in the Territory's Annual Trade Report as the production of the Southern province. For example, by the end of September in the year under review a total of 6,600 tons of sisal had been produced in Lindi and evacuated from that port, but only 4,000 tons of this total have been direct shipments and the balance has been credited to the various ports at which it was transhipped. Attention is only drawn to this matter to show that considerable caution is necessary when considering the productivity and progress of this province by reference to the published export statistics. In the case of all crops the actual surplus produced for sale and export is in excess of the amounts tabulated in the Trade Reports.

20. *Sisal*.—This industry has enjoyed another prosperous year and a record production is anticipated. Estates have been able to continue their replanting programmes and considerable activity has been witnessed.

21. Once again a number of estates have suffered a period of enforced inactivity due to supplies of leaf being inadequate to keep the factory in operation throughout the year. Almost all plantation owners have been searching for new land and a number of applications are now before Government. Four new blocks of land have been alienated. One estate has found it necessary to bring into cultivation the slopes on one side of Lindi Bay.

22. It is expected that there will be some developments in the Kilwa district in the near future. This district has so far escaped the attention of planters but there would seem to be no reason why a limited development with sisal should not be attended with success. A survey of available fresh water supplies is required.

23. The local industry is spared the major troubles connected with a shortage of labour which beset many estates in the other sisal producing areas. Although from time to time shortages of specialized workmen do occur, there is an abundant supply of cheap and good immigrant labour from Portuguese East Africa available for the majority of purposes. The presence of some free-lance recruiters from northern Tanganyika has created a temporary disturbance in many local labour camps and it is apparent that the activities of such persons when visiting areas which themselves are large employers of labour, needs some control.

24. *Cotton*.—After a series of seasons in which the production of cotton by natives remained more or less constant but at a low level, 1936 saw an improvement and a healthy increase in output was obtained. Prices were considered satisfactory and there was a more hopeful outlook for still further effort this present season than had been apparent for some years. The effort was made and production has again increased by a good margin. Had prices been

maintained an optimistic view could now have been taken of the future. Unfortunately the reverse has been the case and growers have been confronted with rapidly falling prices since the markets opened. There has been widespread dissatisfaction and in some areas producers have so far declined to sell their crop at all. The ginneries have been alive to the situation and where possible have voluntarily increased prices in an effort to satisfy growers and so to ensure continued production. The market dropped too drastically for these subsidies to be continued indefinitely however, and it is doubtful if these well-meant efforts have been of much avail. Thus, for reasons over which the various parties to the industry have no control, much ground has again been lost.

25. On account of the holding-off of the rains late-planting was unavoidable almost throughout but thereafter conditions improved and increased outputs from all districts are being realized. Seed of the U/4 variety, derived from the crop produced in Tunduru during the previous season, was distributed in the Masasi and Tunduru districts, the remaining areas being supplied with the existing Uganda Upland type. Seed was distributed as under :—

District	1935			1936			1937	
	Tons	People		Tons	People		Tons	People
Lindi ...	41	6,265	...	36	5,759	...	53	8,484
Mikindani ...	35	5,000	...	24	6,350	...	44	9,000
Masasi ...	14	2,363	...	6	1,255	...	8	942
Tunduru ...	3	350	...	5	352	...	20	1,071
Kilwa ...	93	5,907	...	62	6,423	...	79	10,000
Songea ...	—	—	...	3½	600	...	—	—
Non-native ...	Not recorded		...	16	—	...	17	—
Total ...	186	19,885	...	152½	20,739	...	221	29,497

26. *Marketing*.—The organization and supervision of the cotton markets has been a heavy duty for the depleted staff. The Lindi, Masasi and Tunduru crop was purchased by the ginneries at the usual minimum prices promulgated by Government. In the Lindi and Masasi districts prices opened at the various buying centres on the basis of a reduction for every fifty miles from which the market was distant from the ginnery but it quickly became evident that this system was giving rise to considerable bewilderment and dissatisfaction amongst producers and authority was obtained to revert to the flat rate method which had been in operation in previous years. This was fixed at one and a half cents per kilogram less than the promulgated minimum price for all markets; a figure distinctly generous to producers. Special arrangements were made for the Tunduru district on account of the long haulage necessary to bring the crop to the ginnery. The Mikindani crop was purchased by the new owners of the Mikindani Ginnery, and in view of the fact that no buying centre in this district is situated at a greater distance than fifty miles from the ginnery a uniform rate was generally paid. The Kikanda Ginnery handled the Kilwa crop and the marketing arrangements, which had been undertaken by the District Officer, worked smoothly and well.

27. At the time of writing it is only possible to report the sales of seed cotton in the Tunduru district. Marketing in the other districts is still continuing and the full returns will not be available until the close of the year. All districts are showing an increase in production over last year's figures.

Growers in the Tunduru district sold 134 tons at Shs 22,847/43. Production in this district is making rapid strides as the following figures show :—

		Kgs		Local value
1934 ...	...	1,718	...	Shs 260 00
1935 ...	...	17,444	...	„ 2,551 00
1936 ...	...	51,000	...	„ 8,428 00
1937 ...	...	134,914	...	„ 22,847 43

28. The production of cotton on non-native estates is receiving increasing attention. The cotton is mainly interplanted with young sisal and 200 bales are expected this season as against 125 bales last year.

29. *Grain*.—As foreshadowed in the report for 1936, there was an exceptionally large carry-over of grain into the present statistical year and almost 4,000 tons had left provincial ports by the end of June; that is to say, before the new crop came in. Subsequently there has been but little activity. The more successful areas have only gathered moderate harvests and there are large localities already experiencing a shortage. Luckily the experience of previous seasons has again been repeated and the cash crops, particularly sesame, have provided the people with the means to purchase their deficiencies of grain. A poor year for grain is almost always a good year for sesame, and vice versa; this fact is of the greatest importance in the internal economy of a province which is a major producer of both products. The soundness of the interplanting of sesame with millet is again demonstrated.

30. *Rice*.—The season has been entirely favourable for the growing of rice and the volume available for export has been well maintained. The Lindi district, in particular, enjoyed a bumper harvest. Some progress has been made in demonstrating the interplanting of cotton in the standing rice.

31. *Sesame*.—With the closing of the Mpapura Agricultural Station no further technical work on the selection of sesame has been possible. The main achievement of the past has been the provision of a white seed commanding a premium of up to £2 per ton over the mixed or coloured types, and the evolution of a simple technique for seed selection such as can be practised by native producers. In addition, a substantial quantity of white seed has been distributed to cultivators. At the conclusion of the harvest this year the native treasuries in all sesame producing districts provided funds for the purchase of white seed from the areas in which this type was issued in the previous year. The material so obtained will be distributed in new areas in time for the next planting season. Thereafter the further and final elimination of the mixed types will be sought through the process of seed selection. A noticeable improvement in the colour factor is already apparent but the proportion of white seed coming into the markets is not yet sufficiently high to enable merchants to differentiate in price between the two qualities. Exports amounted to 4,672 tons as compared to the previous highest total of 4,381 tons in 1935.

32. *Groundnuts*.—The increased planting of this crop noted in previous reports continues and the records of the three preceding seasons have again been exceeded. Increased production in the inland districts has contributed largely to this result. Exports for 1937 have totalled 2,056 tons as compared to 1,386 tons in 1936 and 375 tons in 1931.

33. *Beeswax*.—It has been a good beeswax year with an export of 287 tons as compared to the previous highest of 270 tons in 1935. Departmental activity

is directed towards producing better and cleaner wax which, thanks to recent legislation and to the work which has already been done, shows a steady improvement. Three African instructors and one native authority employee attended a course of instruction held by the Entomologist at Morogoro in June and have subsequently been engaged on demonstrating clean wax production and instructing in bee husbandry. Much of the total tonnage exported is derived from the Tunduru and Songea districts and a substantial but unknown quantity is undoubtedly produced across the Portuguese border and marketed locally.

34. *Copra*.—There is no development with this product to record and Kilwa alone produces any appreciable quantity. Coconuts harvested in the Lindi and Mikindani areas are mainly consumed as food and a large number are carried to the up-country districts annually for this purpose.

35. *Colombo or Calumba Root*.—The year has seen a revival of this small industry. The plant from which the commercial roots are obtained (*Jatropha palmata*) is to be found growing wild in quantity in the coastal districts bordering on, or adjacent to, the Rovuma river and it is known to exist in Portuguese East Africa. Production ceased entirely soon after the war due to excessive stocks. Production is mainly centred in the Mikindani and Newala districts and the bulk of the shipments have been to India, with small trial consignments to the United Kingdom and to America. In the four months since production started in June, 115 tons with a value of Shs 32,100/- have been evacuated. Market reports indicate that the demand for Colombo Root is very variable. The uses to which it is put are mainly medicinal and so limited; any tendency to over-supply normal trade requirements is likely to cause a sharp decline in price.

MPAPURA AGRICULTURAL STATION

36. This station has now been finally closed as an agricultural unit and has been handed over to the Provincial Administration. During the season under review no work other than the production of a few bags of sesame for seed purposes was carried out and the District Officer, Mikindani, in whose district the station is situated, has now taken possession of the buildings.

DEMONSTRATION FARMS

37. It has been considered advisable to close down a number of these farms until such time as more adequate European staff is available for supervision and inspection. The farms in the Tunduru and Mikindani districts have therefore been abandoned. In the Lindi and Masasi districts, where regular supervision is practicable, good work has been done and all the farms so situated, fifteen in number, have given good results. The produce of each farm is the property of the instructor in charge and, though the final figures of yield and harvest cannot yet be recorded, some very substantial individual results are already known. This, of course, is satisfactory and in due course it will be possible to ascertain the average annual revenue of these self-contained holdings. Of greater importance, however, is the interest which is becoming apparent in these farms amongst the people living in the areas in which they are situated and there are already grounds for thinking that they will achieve in greater or less degree the purposes for which they were designed. In one locality in which no holding has yet been opened the headman has requested that one may be started. The farms also serve as centres for

the introduction of new crops or varieties and the making of compost is not to be neglected.

38. A scheme of school gardens has been designed for use at the schools maintained by the Universities Mission to Central Africa in the Masasi district. It is intended that a number of the gardens will be opened during the 1938 season. The layout of each garden is similar to that adopted for the demonstration farms and which received detailed mention in the last report. In the arid sandy conditions so typical of the Masasi district special stress is being laid on the maintenance of soil fertility.

PESTS AND DISEASES

39. The province has been singularly free from pests and diseases. Vermin and game animals are probably the most serious menace with which the local cultivator has had to contend but even in this field no wholesale damage has been recorded. Small swarms of the Red Locust crossed the Rovuma river in June and July flying northwards. Practically no damage to crops was observed. The Songea tobacco crop escaped any major infections and the quality was better than anything that has been produced so far. The usual pests of cotton were of low incidence.

COMMUNICATIONS

40. There has been considerable activity in road construction both in the opening up of new highways and in the maintenance of existing communications. Nevertheless further improvement in the condition of many district roads is imperative. On some occasions, certain cotton markets could not be held as the lorries were unable to reach the markets.

CONCLUSION

41. For the fourth consecutive time, it is possible to record a year of steady progress. That individual records have been broken is satisfactory. That an increase in one crop has not been gained at the expense of another is of much greater importance. A new stage has been reached and ambitions should be revised. Perhaps the most satisfactory result of a review of the past few years is the knowledge that continuous prosperity has not led to any diminution of effort; the reverse has been the case.

42. It remains only to record and to acknowledge gratefully the happy relationship which has prevailed between officers of the department and those of others, notably the Provincial Administration. Also, I wish to thank the officers of the department stationed in the circle who have done their work loyally and well.

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